_______, 1996

Dear Reader:

We are pleased to provide this Draft Environmental Impact Statement and Environmental Impact Report (EIS/EIR) for the proposed Imperial Project for your review and comment. The proposed project would be located on public lands in eastern Imperial County. The purpose of this document is to provide information to the public, as well as Cooperating and Responsible agencies regarding the environmental consequences of establishing the proposed open-pit, heap-leach, precious metal mine. Various technical reports have been prepared which have been used in the preparation of this Draft EIS/EIR. Copies of the technical reports are available for review at the libraries listed herein, the Imperial County Planning/Building Department and Bureau of Land Management (BLM) office in El Centro, California.

To facilitate review, this document has been prepared as an Environmental Impact Statement (EIS) in compliance with the National Environmental Policy Act (NEPA) and implementing regulations. The Bureau of Land Management is the lead agency for the purpose of compliance with the requirements of NEPA for the proposed project.

This document has also been prepared as an Environmental Impact Report (EIR) in compliance with the California Environmental Quality Act (CEQA) and implementing regulations and guidelines. The County of Imperial is the lead agency for the purpose of compliance with the requirements of CEQA for the proposed project.

Comments concerning the adequacy or accuracy of this Draft EIS/EIR will be considered in preparation of the Final EIS/EIR. A 90-day public review period has been established for this document. In addition, two public hearings will be held during the public comment period to receive verbal testimony on the following dates: _______, 1996, at _______, California _____ (619/___-____); and _______, 1996, and at _______, California _____ (619/___-____). Written comments on this document will be accepted through _______, 1996, and should be addressed to:

Bureau of Land Management
1661 South 4th Street
El Centro, California 92243

For information concerning the federal aspects of the project, including comments on the EIS, contact the BLM at (619) 337-4412. For information concerning non-federal aspects of the project, including comments on the EIR, contact Jurg Heuberger of Imperial County at (619) 339-4236, Extension 310.

Respectfully submitted,

Terry Reed
Area Manager
El Centro Resource Area

Jurg Heuberger, AICP, CEP
Planning Director
County of Imperial

Revised Copy of October 1, 1996

LIBRARY LIST

BLM Library SC-322A
Bldg. 50, Denver Federal Center
P.O. Box 25047
Denver, CO 80225

Brawley Public Library
400 Main Street
Brawley, CA 92227

SDSU Library
720 Heber Avenue
Calexico,CA 92231

Imperial County Library
1647 West Main Street
El Centro, CA 92243

Imperial County Free Library
939 West Main Street
El Centro, CA 92243

Imperial Public Library
P.O. Box 38
Imperial, CA 92251

Arizona Western College Library
P.O. Box 929
Yuma, AZ 85366

Ft. Yuma Indian Reservation Library
Tribal Library - Quechan Tribe
P.O. Box 1899
Yuma, AZ 85366-1899

Palo Verde District Library
125 W. Chanslor Way
Blythe, CA 92225

Calexico City Library
850 Encinas Avenue
Calexico, CA 92231

Meyer Memorial Library
225 West Main Street
Calpatria, CA 92233

El Centro Public Library
539 State Street
El Centro, CA 92243

Imperial Valley College Library
380 East Aten Road
Imperial, CA 92251

Holtville Library
101 East Sixth Street
Holtville, CA 92250

Yuma County Library District
350 South 3rd Avenue
Yuma, AZ 85364

IMPERIAL PROJECT
IMPERIAL COUNTY, CALIFORNIA

DRAFT
ENVIRONMENTAL IMPACT STATEMENT/
ENVIRONMENTAL IMPACT REPORT

VOLUME I
(~~without Appendices~~ including Appendix A)

State Clearinghouse No. 95041025

~~JULY~~ OCTOBER 1996

Applicant

Chemgold, Inc.

Prepared By:

U.S. Department of the Interior
Bureau of Land Management

County of Imperial
Planning and Building Department

Henri R. Bisson Date
District Manager
California Desert District

Jurg Heuberger, AICP Date
Planning Director
County of Imperial

Revised Copy of October 1, 1996

Imperial Project, Imperial County, California
Plan of Operations Approval and Right-of-Way Approval
Imperial County Conditional Use Permit~~,~~ and
Reclamation Program Approval
Draft Environmental Impact Statement/Environmental Impact Report

Lead Agencies:

U.S. Department of the Interior
Bureau of Land Management
California Desert District
El Centro Resource Area

County of Imperial
El Centro, California

Prepared By:

Environmental Management Associates, Inc.

For Information Contact:

Keith Shone
Bureau of Land Management
1661 S. 4th Street
El Centro, California 92243
(619) 337-4412

Jesse Soriano
Imperial County Planning~~-and~~
/Building Department
939 Main Street
El Centro, California 92243
(619) 339-4236

Abstract:

The Imperial Project (Project) is a proposal by Chemgold, Inc. to develop an open-pit, precious metal mining operation utilizing heap leach processes. The proposed site is located in eastern Imperial County, California, approximately 45 miles northeast of El Centro, California and 20 miles northwest of Yuma, Arizona. The Project area is comprised of approximately ~~1,648~~ 1,625 acres of unpatented mining claims on public lands administered by the U.S. Bureau of Land Management (BLM), El Centro Resource Area Office, of the California Desert District.

Up to 150 million tons of ore would be leached and 450 million tons of waste rock would be deposited at the proposed waste rock stockpiles or the mined-out portions of the three (3) planned open pits. The expected maximum average mining rate would be 130,000 tons per day. Approximately ~~1,400~~ 1,392 acres of surface disturbance would occur as a result of the Proposed Action. Mining activities would be performed 24 hours per day, seven (7) days per week, and are projected to commence in 1997 and terminate around the year 2016. Reclamation activities would likely continue beyond the year 2016.

The proposed mine would include a lined heap leach pad designed and constructed to support and contain the ore heap and to collect process fluid from the treated heap for precious metal recovery. Blasted ore rock would be mined and hauled directly to the heap without crushing (run-of-mine). Blasted waste rock would be hauled directly to a waste rock stockpile or to one of the on-site pits to be backfilled.

A ground water production well field, consisting of up to four (4) ground water production wells, would be completed and used to provide water for processing operations, dust control and domestic uses. —Electrical power would be supplied by a local utility company. Emergency power during periods of utility service interruption would be provided by a diesel-powered, electric generator located near the processing facility in the Project mine and process area.

The Proposed Action incorporates mitigation measures ~~such that most~~ to reduce the significance of impacts to the human environment ~~would not be significant~~. However, mine construction, operations, facilities, and conditions would visually contrast with the surrounding landscape and would conflict with California Desert Conservation Area visual objectives for Class II areas. The Proposed Action would generate up to 100 local job opportunities, would involve $48 million in initial capital expenditures, $1.7 million per year in continuing capital expenditures, and $26 million per year in non-capital expenditures including payroll. In addition, the Project would pay sales tax on expenditures and pay local property taxes on mine assets. These would be beneficial effects of the Proposed Action.

Alternatives to the Proposed Action include:

- Reduced Project Alternative;
- Complete Pit Backfill Alternative; and
- No Action Alternative.

Additional alternatives were considered, but were eliminated from further detailed discussion in the EIR/EIS on the basis of environmental and operational factors.

Federal, State, and Local Agency Authorizing Actions Required for the Imperial Project

Approval of Plan of Operations for mine and process operations from BLM;

Right-of-Way approval for relocation of Indian Pass Road;

Right-of-Way approval for new and rebuilt transmission lines;

Issuance of Record of Decision from the BLM;

Biological Opinion from the U.S. Fish and Wildlife Service with formal consultation from the BLM in conformance with Section 7 of the federal Endangered Species Act;

~~Notification of Nationwide Permit Use~~ Individual Clean Water Act Section 404 Permit from the U.S. Army Corps of Engineers;

User of High Explosives Permit from the Bureau of Alcohol, Tobacco and Firearms;

Explosives Permit from the Imperial County Sheriff;

Waste Discharge Requirements for discharge of wastes to land from the California Regional Water Quality Control Board, Colorado River Basin Region;

Certification of Compliance with Section 401 of the federal Clean Water Act from the California Regional Water Quality Control Board, Colorado River Basin Region;

California Endangered Species Act (Fish and Game Code Section 2081) Management Permit from the California Department of Fish and Game;

Stream or Lake Alteration Agreement (Fish and Game Code Section 1601 or 1603) from the California Department of Fish and Game;

Section 106 process with the California State Office of Historic Preservation;

Conditional Use Permit from the Imperial County Planning~~ and ~~/Building Department for drilling ground water production wells;

Reclamation Plan approval from the Imperial County Planning~~ and ~~/Building Department for Project mine and process facilities;

Building Permits and Certificate of Occupancy from the Imperial County Planning~~ and ~~/Building Department;

Individual Septic Disposal System Permit from the Imperial County Department of Health Services;

Authority to Construct applicable air pollution emission units from the Imperial County Air Pollution Control District;

Permit to Operate applicable air pollution emission units from the Imperial County Air Pollution Control District;

Encroachment Permit from the Imperial County Department of Public Works and Road Revocation from the Imperial County Board of Supervisors for Project access off, and relocation of, Indian Pass Road; and

Plan Review by the Imperial County Fire Department for conformance with Uniform Fire Code.

IMPERIAL PROJECT
DRAFT ENVIRONMENTAL IMPACT STATEMENT/
ENVIRONMENTAL IMPACT REPORT

VOLUME I

SUMMARY

PURPOSE OF THIS DOCUMENT

The purpose of this Draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR) is to analyze the potential impacts of, and mitigation measures for, the proposed Imperial Project (Project) and reasonable alternatives for a conventional open-pit, heap-leach, precious metal mine proposed by Chemgold, Inc. The Project would be located on public lands in eastern Imperial County, California. This EIS/EIR is being jointly prepared by the U.S. Department of Interior, Bureau of Land Management (BLM), which is the Lead Agency with respect to compliance with the National Environmental Policy Act (NEPA) and its implementing regulations, and the Imperial County Planning ~~and~~ /Building Department (ICPBD), which is the Lead Agency responsible for compliance with the California Environmental Quality Act (CEQA). The purpose of this joint EIS/EIR is to provide decision-makers in all agencies required to approve authorizing actions with sufficient information to (1) make informed decisions regarding the anticipated significant impacts of the Project; and (2) determine if possible mitigation measures or alternatives are available which could reduce those identified impacts of the Project to below the level of significance. This joint EIS/EIR is also intended to provide this same information about the proposed Project to the concerned public and solicit their comments.

As the federal agency responsible for management of the Project area land and minerals, the BLM has assumed responsibility as the Lead Agency with respect to compliance with the National Environmental Policy Act (NEPA) (Public Law 91-90, 42 U.S.C. 4321 *et seq.*). This document is being prepared as an EIS in compliance with NEPA, the Council of Environmental Quality regulations implementing NEPA (40 CFR 1500-1508), and the Bureau of Land Management (BLM) guidelines for implementing NEPA (USDI, 1988).

As the local agency responsible for implementing the California Surface Mining and Reclamation Act of 1975 (SMARA) for the Project, the ICPBD has assumed responsibility as the Lead Agency with respect to compliance with the California Environmental Quality Act (CEQA) (Public Resources Code 21000 *et seq.*). This document is being prepared as an EIR in compliance with CEQA, the Guidelines for the Implementation of CEQA (CEQA Guidelines) (14 CCR 15000 *et seq.*), and Imperial County guidelines for the preparation of an EIR.

This joint EIS/EIR has been prepared in two (2) separate volumes. Volume I of this document contains this Summary, the Table of Contents, ~~and~~ Chapters 1 through 11, and Appendix A (the Imperial Project Reclamation Plan). Volume II contains all of the other appendices.

PROPOSED ACTION

Chemgold, Inc. has proposed the development of a conventional open-pit, heap leach, precious metal mine, the Imperial Project (Project), to be located in eastern Imperial County, California, approximately 45 miles northeast of El Centro, California and 20 miles northwest of Yuma, Arizona (Figure S-1). The Project area consists of unpatented mining claims on public lands administered by the U.S. Bureau of Land Management (BLM), El Centro Resource Area Office, of the California Desert District, which are located within portions of Sections 28, 29, 30, 31, 32 and 33, Township 13 South, Range 21 East, and Sections 4, 5, 6, 7, and 8, Township 14 South, Range 21 East, San Bernardino Baseline & Meridian (SBB&M) (Figure S-2). The Project would be located south of State Route 78 and north of Interstate Highway 8 and would be accessed via Ogilby Road, a secondary paved road, and Indian Pass Road, a County-maintained dirt road. Some light vehicles could also occasionally access the Project area via BLM Route A278, Hyduke Road.

Up to 150 million tons of ore would be mined and leached under the Proposed Action, and up to 450 million tons of waste rock would be mined and deposited in the waste rock stockpiles or the mined-out portions of the open pits, at a maximum average mining rate of 130,000 tons per day. Mining activities, performed 24 hours per day and seven (7) days per week, are projected to commence in 1997 and terminate around the year 2016. Reclamation activities would likely continue beyond the year 2016.

The Project mine and process area would contain all of the open pits, waste rock stockpiles, soil stockpiles, administration office and maintenance facility area, heap leach facility, precious metal recovery plant and other facilities, internal roads, and the on-site diesel-fueled emergency power generator. A maximum of approximately ~~1,364~~ 1,356 acres of surface disturbance would be created within the approximately ~~1,612~~ 1,589-acre mine and process area (Figure S-3). The ground water production wells and water pipeline, the electrical power metering station and new 92 kV/7.2 kV transmission line, and a relocated portion of Indian Pass Road, would be located on or near Indian Pass Road outside of the Project mine and process area and result in an additional 36 acres of surface disturbance (Figure S-3). The building of a new 92 kV transmission line over approximately sixteen (16) miles of an existing 34.5 kV transmission line would use existing access and ~~re~~disturb a maximum of approximately 21 acres, some of which would be redisturbance of previously disturbed areas~~, but would not create any new surface disturbance~~.

Figure S-1: Imperial Project General Location Map

Figure S-2: Imperial Project Vicinity Map

Figure S-3: Imperial Project Mine and Process Area Facilities

Mining of the pits would be phased, and would consist of drilling, blasting, loading and hauling. Ore would be hauled, without crushing, to the heap leach pad to be leached of the precious metals with a dilute solution of sodium cyanide. The heap leach pad would be lined with synthetic materials as an engineered zero-discharge facility with leak detection systems, in conformance with the requirements of the California Regional Water Quality Control Board, Colorado River Basin Region. The leached precious metals would be recovered from the cyanide solution in the process plant, and shipped offsite as gold doré. Waste rock would be placed on waste rock stockpiles located adjacent to the pits, or into previously mined-out open pits. The West Pit would be the first pit mined and would be entirely backfilled under the Proposed Action.

Up to four (4) ground water production wells would be drilled and completed to provide the Project peak water requirements of approximately 1,000 gallons per minute (gpm) and 1,200 acre feet per year (afy). These wells would be drilled adjacent to a 1.5-mile section of Indian Pass Road outside of the Project mine and process area. The produced water would be pumped to the Project mine and process area via an underground pipeline.

Peak Project electrical demand of up to eight (8) MW would be ~~purchased~~ provided from ~~a local~~ the utility grid. This would require the "overbuilding" of an existing Imperial Irrigation District (IID) 34.5 kV transmission line for approximately sixteen (16) miles from Interstate 8 near Sidewinder Road to Indian Pass Road near Ogilby Road with a new 92 kV transmission line also owned by the IID (Figure S-2). At that point a new metering station and a new 92 kV transmission line, both proposed to be owned by the Project, would be constructed adjacent to Indian Pass Road for approximately 4.5 miles to a mine substation within the Project mine and process area ~~(Figure S-2)~~. A new 7.2 kV distribution line would also be built on the same transmission line poles under the new 92 kV transmission line from the Project mine and process area to provide power to the Project ground water well pumps located along Indian Pass Road. A 500 kW± diesel-powered emergency electric generator would be located in the Project mine and process area.

An approximately 6,000-foot section of Indian Pass Road would be realigned approximately 1,000 feet to the west of the Project mine and process area prior to mining the West Pit (Figure S-3), and the intersection of Indian Pass Road with Ogilby Road would be realigned. Several ephemeral drainages would be temporarily and/or permanently diverted around Project facilities within the Project mine and process area, although all diversions would return the diverted water to the same major ephemeral drainage system.

Reclamation activities would be conducted in accordance with SMARA and the regulations found at 43 CFR 3809.1-3(d) and 14 CCR 3500. The proposed Reclamation Plan includes measures for: protecting wildlife and the public; minimizing erosion and mass failure potential; demolishing structures and neutralizing process components; regrading

selected side and cut-and-fill slopes; revegetating; and, where feasible, providing for the resumption of pre-mining land uses. Figure S-4 shows the projected final configuration of the East Pit and the backfilled West Pit subsequent to the completion of mining and placement of waste rock but prior to the commencement of final reclamation.

Approximately 100 workers may be required to construct the Project facilities, although only a portion of these workers would be at the Project site at any given time. Approximately 150 workers would be employed to operate the Project. Project traffic on Ogilby Road and Indian Pass Road is estimated at approximately 47 lightweight vehicle round trips, and 3.5 heavy truck round trips, per day. The Project would generate approximately $68 million in annual expenditures for payroll, taxes, and local purchases in 1997.

REDUCED PROJECT ALTERNATIVE

The Reduced Project Alternative would reduce the scope of the Project by mining only the West Pit and Singer Pit, including portions of the Mineralized Potential Area, and the accompanying construction of the necessary heap leach pad and waste rock stockpile(s) with appropriate capacities (see Figure S-5). The Reduced Project Alternative would decrease the total tons of ore and waste rock to be mined to approximately 270 million tons, approximately 45 percent of that mined by the Proposed Action. The total estimated surface area disturbed by the Reduced Project Alternative would be approximately ~~861~~ 853 acres, approximately 62 percent of the surface area disturbed by the Proposed Action.

The expected mine life of the Reduced Project Alternative would be approximately ten (10) years. Since the East Pit would not be mined under the Reduced Project Alternative, there would be no waste rock from the East Pit available to completely backfill the West Pit (see Figure S-6).

COMPLETE PIT BACKFILL ALTERNATIVE

The Complete Pit Backfill Alternative consists of the complete filling of all of the open pits with mined material to at least original grade. Subsequent to the completion of mining (as described under the Proposed Action), waste rock would be loaded back into the haul trucks, which would be driven to the edge of the open pit(s) and the waste rock dumped into the pit(s). It would require up to approximately 5.25 years (5 years, 3 months) to move enough waste rock back into the open pits to fill them all to grade once mining was complete, and cost up to approximately $125 million, which exceeds the anticipated return on the Project.

Figure S-4: Imperial Project Mine and Process Area - Projected Final Contours

Figure S-5: Reduced Project Alternative - Mine and Process Area Facility Details

Figure S-6: Reduced Project Alternative - Mine and Process Area Projected Final Contours

Because broken rock occupies a greater volume than the same volume of solid rock, all of the rock mined from an open pit will not fit back into that same pit. A sufficient volume of waste rock would be available to backfill all of the pits, and the spent leached ore, and some waste rock, would remain where originally placed. The Complete Pit Backfill Alternative would not result in any reduction of surface disturbance compared to the Proposed Action since the Complete Pit Backfill Alternative includes completion of the Proposed Action. However, a substantial amount of the surface area disturbed by waste rock stockpiles and the East Pit and Singer Pit would be reclaimed "at grade," and not reclaimed as a stockpile or pit, since the waste rock contents of the stockpile would have been removed and dumped into the open pits (see Figure S-7).

NO ACTION ALTERNATIVE

If the No Action (no project) Alternative is implemented, the Project ~~site~~ area would remain as is, and present uses in the area, including opportunities for dispersed recreational activities, would continue. The ~~site~~ Project area would remain available for future commercial gold processing proposals or for other proposals as permitted by BLM policy or land use designations.

ENVIRONMENTAL CONSEQUENCES, MITIGATION MEASURES, AND SIGNIFICANCE

A summary of the environmental consequences of, mitigation measures for, and level of significance of the environmental consequences before and after mitigation for the Proposed Action and each Alternative identified in this EIS/EIR, are summarized in the following four (4) tables. Detailed discussions of the environmental consequences of, mitigation measures for, and significance before and after mitigation of, the Proposed Action and each of the Alternatives, are provided in Chapter 4 of this EIS/EIR.

Figure S-7: Complete Pit Backfill Alternative - Mine and Process Area Projected Final Contours

Table S-1: Summary of Potential Environmental Effects and Mitigation Measures
Imperial Project - Proposed Action

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
Geology and Mineral Resources:			
• Possible damage to ore heap, waste rock stockpiles, ~~soil stockpile,~~ and pit slopes due to seismic shaking.	S	4.1.1-1: Heap leach pad and waste rock stockpile slopes shall be constructed at overall slopes no steeper than 2H:1V.	NS
		4.1.1-2: Mine pit slopes shall be constructed at overall slopes no steeper than 1H:1.2V (50 degrees) unless mining conditions and geotechnical factors demonstrate through engineering analysis that steeper slopes would be safe, and such steeper slopes shall be approved by the BLM. Slopes shall not be steeper than is safe considering actual rock strength and structural conditions encountered.	
		4.1.1-3: Approximately 40-foot wide benches ~~Benches~~ shall be constructed at approximately 80-foot high ~~appropriate~~ intervals on mine pit slopes to catch loose rocks. Approval shall be obtained from the BLM prior to construction of mine pit benches which differ substantially from these specifications.	
		4.1.1-4: Project structures subject to the Uniform Building Code shall be designed and constructed consistent with the standards of Seismic Zone 4.	
		4.1.1-~~4~~5: To avoid any significant slumping or slope failure of the waste rock stockpile slopes, a slope stability analysis of the proposed waste rock stockpile slope configurations shall be conducted prior to the placement of waste rock on the stockpile, and the results of any study should be followed during the construction of the waste rock stockpile.	
Soil Resources:			
• Mine construction will result in the loss of ~~shallow surface~~ soils from the Project area.	S	4.1.2-1: Surface disturbance shall be kept to the minimum that is required to construct and operate the project.	NS
		4.1.2-2: Soils shall be salvaged from all areas where sufficient soil development is noted in conformance with the approved Reclamation Plan. Soils shall be salvaged to the greatest depth practicable and placed in stockpiles clearly delineated with signs to assure the material is not mistaken as waste rock.	
• Diversion of drainage channels and construction of the ore heap, waste rock stockpiles, soil stockpiles, and pits could result in accelerated soil erosion within the Project area.	S	4.1.2-3: All mine facilities shall be designed and constructed with erosion control features engineered to meet the performance standards ~~at~~ of 14 CCR 3706, including the control of runoff and protection of areas susceptible to erosion from surface flows.	NS
		4.1.2-4: A Storm Water Pollution Prevention Plan (SWPPP), incorporating the use of Best Management Practices for erosion control, shall be developed and implemented in accordance with the California Storm Water NPDES permit program.	

S = Significant
NS = Not Significant
SU = Significant Unavoidable
SC = Significant Cumulative
B = Beneficial
* = Cannot be Determined at This Time

Table S-1: Summary of Potential Environmental Effects and Mitigation Measures
Imperial Project - Proposed Action

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
Hydrology (Surface Water):			
• The diversion of drainage channels within the Project area could result in adverse streamflow consequences with respect to bank erosion, loss of surface water from existing drainages, and potential for flooding.	S	4.1.3.1-1: Major watercourses shall be diverted only to the extent necessary to protect Project facilities, and shall be diverted back into the same wash system after as short a diversion as practical. Permanent diversion channels shall be built to approximate the original drainage system in both gradient and channel geometry, and ~~Appropriate energy dissipators shall be constructed at the point of discharge into the pre-existing watercourses, and along banks subject to high erosion potential (such as the outside banks of turns) to minimize the potential for erosion. Diversion channels~~ shall be engineered to adequately contain and deliver stream flows resulting from the 100-year/24-hour precipitation event.	NS
• Potential hydrologic runoff containing contaminants from the ore heap, waste rock or soil stockpiles, or from surface facilities could enter the drainage channels and adversely affect water quality.	S	4.1.3.1-2: All chemicals shall be stored in conformance with applicable local, state and federal regulations. All non-mining wastes shall be stored in secondary containment area and disposed of offsite in an approved landfill. Regulated wastes shall be recycled or disposed of in conformance with all applicable local, state and federal laws and regulations, and in a manner approved by the responsible regulatory agencies. 4.1.3.1-3: Major maintenance of equipment shall be conducted within the concrete-paved and bermed areas of the maintenance yard to the extent possible to minimize accidental discharges of waste lubricants and other materials to the ground. 4.1.3.1-4: Each phase of the heap leach pad system (heap, pad, ponds, etc.) shall be designed to provide for 100-percent containment of the precipitation from the maximum probable one (1)-hour storm event occurring simultaneously with a 24-hour power outage while still maintaining a two-foot freeboard in the process and overflow ponds, or consistent with the requirements of the CRWQCB. 4.1.3.1-5: Sufficient protective measures, such as set-backs or rip rap, shall be designed and employed to ensure that the pregnant, barren, and overflow ponds will not be exposed to erosion or overtopping by storm flows in the natural watercourse located immediately to the east.	NS

S = Significant
NS = Not Significant

SU = Significant Unavoidable
SC = Significant Cumulative

B = Beneficial
* = Cannot be Determined at This Time

Table S-1: Summary of Potential Environmental Effects and Mitigation Measures
Imperial Project - Proposed Action

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
Hydrology (Ground Water):			
• Excessively high pumping rates from individual ground water production wells could result in damage to the aquifer and well bore.	NS	4.1.3.2-1: To prevent excessive drawdown or possible damage to the well or pumping system, ground ~~Ground~~ water production from well PW-1 shall be limited to a maximum average of 550 gpm unless a higher pumping rate, supported by reasonable proof of increased well efficiency, is approved by the ICPBD. The maximum average production rate from each additional production well drilled shall be limited to that rate which prevents excessive drawdown or possible damage to the well or pumping system. 4.1.3.2-3: The total maximum production rate from all of the ground water production wells shall not exceed 1,000 gpm, and the total annual ground water production rate shall not exceed 1,200 afy.	NS
• Cross-contamination of ground water aquifers could result if ground water wells are not properly abandoned.	NS	4.1.3.2-2: Ground water production and monitoring wells shall be plugged and abandoned in conformance with applicable regulatory requirements, including 14 CCR 3713(a).	NS
• Inadequate liner design or installation or, or long-term leaks in heap leach pad, could allow aqueous contaminants from the ore heap to migrate from the surface through the soil to ground water beneath the Project mine and process area.	S	4.1.3.2-~~3~~4: The heap leach pad shall be designed, constructed and operated in conformance with the specifications, requirements and prohibitions of Waste Discharge Requirements issued by the CRWQCB. 4.1.3.2-~~4~~5: The heap leach pad shall be monitored in conformance with the requirements of the Monitoring and Reporting Program issued by the CRWQCB.	NS

GW monitoring plan —

S = Significant
NS = Not Significant

SU = Significant Unavoidable
SC = Significant Cumulative

B = Beneficial
* = Cannot be Determined at This Time

Table S-1: Summary of Potential Environmental Effects and Mitigation Measures
Imperial Project - Proposed Action

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
Air Resources:			
• Implementation of the Proposed Action will result in the emission of significant quantities of fugitive PM_{10}.	S	4.1.4-1: Water sprays, chemical treatments acceptable to the BLM, or other RACM determined acceptable by the ICAPCD shall be applied to the haul and maintenance roads within the Project mine and process area to minimize the generation of fugitive PM_{10}. If water sprays are used, they shall be applied no less than once per day on days without precipitation unless road surface moisture is documented as sufficient to suppress fugitive dust emissions without additional water. 4.1.4-2: Project employees, contractors, and visitors shall be advised of the need to adhere to speed limits to minimize the generation of fugitive dust. 4.1.4-3: Shrouding of the lime discharge to the ore trucks and prompt revegetation of the soil stockpiles, or equivalent RACM for these fugitive PM_{10} emissions, shall be implemented and maintained. 4.1.4-4: Water sprays or chemical treatments acceptable to the ICPWD shall be applied to Indian Pass Road from its intersection with Ogilby Road to the boundary of the Project mine and process area with sufficient frequency to minimize the emissions of fugitive PM_{10} from Project traffic on Indian Pass Road. 4.1.4-~~4~~5: All permits required by the ICAPCD shall be obtained, and all operations conducted in general compliance with the conditions of these permits. 4.1.4-~~5~~6: All disturbed surfaces no longer needed for project activities shall be reclaimed as soon as practical to minimize fugitive PM_{10} emissions from wind erosion.	NS

S = Significant
NS = Not Significant

SU = Significant Unavoidable
SC = Significant Cumulative

B = Beneficial
* = Cannot be Determined at This Time

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
Biological Resources:			
• Wildlife could enter the Project mine and process area and be endangered by mine activities or potentially harmful materials stored at the mine.	S	4.1.5-1: Applicant shall construct a fence ~~no less than four (4) feet in height~~ around the entire Project mine and process area. The fence shall be constructed no less than four (4) feet in height with 3-strands of smooth wire, or equivalent~~, and shall include tortoise exclusion fencing, in conformance with responsible agency requirements, to inhibit wildlife access to Project facilities~~. That portion of the perimeter fence constructed along the western boundary of the Project mine and process area, including all of the fenceline adjacent to Indian Pass Road (see Figure 2-2), shall be a chain-link fence, no less than six (6) feet in height, to restrict public access to the Project area. The entire perimeter fence shall include desert tortoise exclusion fencing, in conformance with responsible agency requirements, to inhibit wildlife access to Project facilities (see also Mitigation Measure ~~4.1.5-40~~ 4.1.5-38). Applicant shall ~~also~~ construct ~~an interior~~ a chain-link fence, no less than six (6) feet in height, with one (1) foot of barbed wire at the top, around the ore leach pad, process facilities, and fresh water pond to further restrict wildlife from accessing these facilities. Applicant shall routinely inspect and repair the fences, as necessary. 4.1.5-3: Applicant shall cover the pregnant and barren solution ponds with either small-mesh nets; a solid, 40-mil, HDPE/polypropylene cover; floating plastic balls; or equivalent cover acceptable to the BLM to keep wildlife out of the ponds. Applicant shall maintain the cover over the life of the Project. Applicant shall keep records of all wildlife kills which may be associated with the use of cyanide by the project, including all dead wildlife found in or adjacent to the ponds or heap. Observations of wildlife killed in the ponds or on the heap shall be reported to the BLM, CDFG, and the U.S. Fish and Wildlife Service (USFWS) ~~quarterly~~ monthly for evaluation and, if determined necessary, for possible imposition of additional mitigation requirements (see also Mitigation Measure 4.1.5-34)	NS
• The Project could introduce or allow noxious weeds or plants to invade the Project area.	S	4.1.5-20: Applicant shall implement ~~a weed abatement program over the life of the Project for control of salt cedars (*Tamarisk sp.*) and other potentially noxious weeds that may invade the site. The weed abatement program shall include ordinary practices such as seasonal grubbing and the application of herbicides, as necessary.~~ weed control measures such that all introduced plants (e.g., salt cedar (*tamarisk species*), mustard, and other noxious weeds) will not become established within the Project area. Manual or mechanical means of control will be the preferred methods employed. Use of other methods (e.g., herbicides) will require approval by the BLM. The weed control measures shall be implemented when noxious weeds are visually identified on the site and shall continue over the life of the Project.	NS

S = Significant
NS = Not Significant

SU = Significant Unavoidable
SC = Significant Cumulative

B = Beneficial
* = Cannot be Determined at This Time

Table S-1: Summary of Potential Environmental Effects and Mitigation Measures
Imperial Project - Proposed Action

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
• The Project would result in the loss of approximately 100 acres of microphyll woodland habitat over the active life of the Project and a net loss of about 50 acres of microphyll woodland habitat post-Project.	S	4.1.5-7: Applicant shall construct a fence ~~generally equivalent to the Project perimeter fence entirely~~, no less than four (4) feet in height with 3-strands of smooth wire, or equivalent, around the approximately 40-acre south-central portion of the central wash within the Project mine and process area which is not intended to be disturbed by Project operations to prevent accidental surface disturbance of the microphyll woodland habitat in this internal area during mine construction and operation. 4.1.5-8: Applicant shall provide periodic drip irrigation over the life of the Project to enhance the establishment of ironwood and deer browse vegetation within the surface drainage identified by Mitigation Measure 4.1.5-7~~, as may be appropriate, to enhance the quality of microphyll woodland habitat in this drainage~~. Vegetation selected for enhanced deer browse establishment shall be comprised of species known to occur in the Project area. The composition of the seed mix and the design of the vegetation enhancement measures shall be submitted to the BLM for approval prior to implementation. 4.1.5-9: Applicant shall construct a big game guzzler in a design and location acceptable to the BLM and the CDFG in the general vicinity of the Project mine and process area to ~~mitigate the loss of~~ provide for more intensive use of the existing habitat ~~for~~ by deer and other wildlife. Applicant shall obtain the required permit from the BLM prior to guzzler construction. 4.1.5-10: Applicant shall provide periodic drip irrigation over the life of the Project to enhance the establishment of ironwood and deer browse vegetation along the western slopes and banks of the approximately 3,000-foot section of the existing ephemeral stream channel immediately adjacent to, but outside of, the east-southeast boundary of the Project mine and process area~~ as may be appropriate to enhance the quality of existing microphyll vegetation and available deer browse on this area of this channel~~. Vegetation selected for enhanced deer browse establishment shall be comprised of species known to occur in the Project area. The composition of the seed mix and the design of the vegetation enhancement measures shall be submitted to the BLM for approval prior to implementation. 4.1.5-11: Applicant shall conduct annual transect surveys of the major through-going ephemeral stream channels upstream and downstream of the Project mine and process area to monitor these drainages with respect to existing vegetation and microphyll woodland habitat and document any potentially adverse erosional or depositional processes. The surveys shall also document any sightings of deer fawn, bighorn sheep~~ and any~~, mountain lion, or other species for which monitoring is specified by the BLM. An annual report of the transect surveys shall be prepared and submitted in an acceptable form to the BLM.	NS

S = Significant
NS = Not Significant
SU = Significant Unavoidable
SC = Significant Cumulative
B = Beneficial
* = Cannot be Determined at This Time

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
		4.1.5-12: Applicant shall construct all stream channel diversions to divert flows back into the same major wash system and ensure the continuing flow of an equivalent pre- and post-Project quantity and quality of water through the major drainages to preserve the downstream microphyll woodland habitat within the drainages (see also Mitigation Measure ~~4.1.5-34~~4.1.5-33 and mitigation measures provided for surface hydrology [Section 4.1.3.1.3]). ~~Upon the completion of the backfilling of the West Pit, Applicant shall replace the diverted section of the major western stream channel to its approximate original location within the Project mine and process area.~~	
		4.1.5-15 Applicant shall enter into a Stream Alteration Agreement with the California Department of Fish and Game (CDFG) as may be required pursuant to California Fish and Game Code Section 1603 ~~(see also Mitigation Measure 4.1.5-7)~~. The agreement shall include those measures which CDFG and Applicant agree may be necessary, or appropriate, to mitigate, and compensate for, the impacts of the Project on the stream channels and associated microphyll woodland habitat and wildlife. Measures which may be included in the Stream Alteration Agreement include:	
		(1) Applicant shall acquire title to offsite private lands with comparable microphyll woodland habitat, in a location acceptable to the CDFG and the Applicant, to compensate at a 1:1 ratio for microphyll woodland destroyed and not reclaimed as a result of the Project. Ownership of the acquired land shall be transferred to the CDFG for long term habitat management.	
		(2) Applicant shall construct and/or maintain over the life of the Project one or more additional big game and/or small game guzzlers in a design and location acceptable to the CDFG, Applicant, and BLM, as appropriate, to enhance the habitat for deer and other wildlife.	
		(3) Applicant shall perform reclamation activities on one or more offsite locations on land in the vicinity of the Project acceptable to CDFG, Applicant, and the BLM, as appropriate, to restore microphyll woodland habitat which has been adversely impacted by previous actions unrelated to the Project.	
		(4) Applicant shall either fund or conduct additional biological investigation(s) as may be acceptable to the CDFG and Applicant to develop additional data for future agency decisions reflecting the biological resources associated with stream channels in the general vicinity of the Project.	

S = Significant
NS = Not Significant
SU = Significant Unavoidable
SC = Significant Cumulative
B = Beneficial
* = Cannot be Determined at This Time

Table S-1: Summary of Potential Environmental Effects and Mitigation Measures
Imperial Project - Proposed Action

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
• The Project could adversely affect listed and sensitive plant and wildlife species.	S	4.1.5-4: Applicant shall advise Project employees, contractors, and visitors of the need to adhere to speed limits and to avoid any animals, including the desert tortoise, flat-tailed horned lizard, and deer which may be encountered on or crossing the road to and from the Project area. 4.1.5-26: Applicant shall designate a field contact representative (FCR) who will be responsible for overseeing compliance with protective stipulations for listed species. The FCR shall have authority to halt all activities that are in violation of the stipulations. The FCR shall have a copy of all appropriate stipulations when work is being conducted at the site. The FCR may be a project manager, company environmental coordinator, contract biologist, or ~~a person designated by the agencies.~~ other person identified as responsible by the Applicant. Applicant shall provide the name and contact information of the FCR to the BLM and applicable responsible agencies prior to site construction. 4.1.5-27: Prior to the onset of surface disturbance activities by the Project, Applicant shall retain qualified biologist(s) acceptable to the BLM and the CDFG to inspect the Project mine and process area and capture and relocate any chuckwallas encountered to suitable microhabitat (e.g., rock rubble, rock outcrop ~~and~~, exfoliating cracks or crevice areas) in the shortest distance possible between the outside of the Project mine and process area perimeter fence (not to exceed 1,000 feet) and the point of capture ~~within 1,000 feet outside of the Project mine and process area perimeter fence~~. 4.1.5-28: During mining activities, stockpiling of equipment and vehicles shall utilize those portions of the Project area that will be subject to permanent disturbance. Temporary or inadvertent disturbance to remaining portions of the area should be minimized by: staking, "flagging", or otherwise clearly marking the boundaries of the alignment; notifying employees of the specific areas, boundaries of the areas, and the need to avoid disturbance to remaining areas; and posting signs or erecting temporary fencing at access points to limit access to authorized vehicles and equipment only. All employees shall be instructed that their activities shall be confined to locations within flagged or otherwise marked areas. The area of disturbance shall be confined to the smallest practical area, considering extent and location of ore bodies, topography, placement of facilities and access roads, locations of sensitive species, public health and safety, and other limiting factors. To the extent practical, previously disturbed areas within the Project ~~site~~ mine and process area shall be used for the placement of equipment, work staging sites, or parking of vehicles.	NS

S = Significant
NS = Not Significant
SU = Significant Unavoidable
SC = Significant Cumulative
B = Beneficial
* = Cannot be Determined at This Time

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
		4.1.5-29: Open pipeline trenches, test holes, or test trenches shall be regularly inspected by the ~~staff environmental coordinator or a contract biologist at~~ FCR, or qualified biologist acceptable to the BLM, a minimum of three (3) times per day. During excavation of trenches or holes, escape ramps consisting of loose earth deposited in the test hole or trench shall be placed to facilitate the escape of any wildlife species that may inadvertently become entrapped. Any animals discovered shall either be allowed to escape before activities resume or carefully removed from the pit or trench and allowed to escape. A final inspection of the open trench segment or hole shall also be made by ~~a qualified biologist~~ the FCR, or qualified biologist acceptable to the BLM, immediately prior to backfilling. Arrangements shall be made prior to the onset of maintenance or construction to ensure that listed wildlife species can be removed from the trench without violating any requirements of the federal or California Occupational Safety and Health Administration.	
		~~4.1.5-30: To prevent the creation of on-site colonies of California leaf-nosed bats or other sensitive bat species during active mining operations, and as a means of reducing the site "attractiveness" as a roosting area for these species, Applicant shall screen the openings of any shafts or tunnels constructed on the site during mining operations.~~	
		~~4.1.5-31:~~4.1.5-30: Toxic materials contained on the site shall be stored and used in a manner that prevents harm to desert tortoises and other wildlife species. Methods of containment will be approved by the BLM.	
		~~4.1.5-32:~~4.1.5-31: Nets or other suitable coverings shall be placed over all ponds containing toxic solutions to prevent contact by area wildlife species, including bats. These coverings shall be regularly inspected and maintained by Applicant for the duration of the Project. Methods of cover, inspection, and maintenance will be approved by the BLM.	
		~~4.1.5-33:~~4.1.5-32: Transmission pole design shall prevent any potential for the inadvertent electrocution of raptors (see also Mitigation Measure ~~4.1.5-45~~4.1.5-43). Transmission pole design will be approved by the BLM.	

S = Significant
NS = Not Significant
SU = Significant Unavoidable
SC = Significant Cumulative
B = Beneficial
* = Cannot be Determined at This Time

Table S-1: Summary of Potential Environmental Effects and Mitigation Measures
Imperial Project - Proposed Action

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
		~~4.1.5-35:~~4.1.5-34: Project employees involved with regular activities shall be required to take a threatened and endangered species education program. The program shall include information on the biology of listed and sensitive species and their occurrence in the Project area, measures being implemented for the protection of ~~this species~~ desert tortoise and its habitats during Project activities~~;~~ and means by which individual employees can facilitate this process. A program approved by BLM shall be employed. Wallet-size cards signifying completion of training shall be recommended to employees. All employees shall participate in the education program prior to commencing Project activities. New employees shall receive formal approved training prior to working on-site. The program shall typically last from between 30 minutes and one (1) hour and shall cover the following topics at a minimum: • Distribution; • General behavior and ecology; • Sensitivity to human activities; • Legal protection; • Penalties for violation of State and federal laws; • Reporting requirements; and • Project mitigation measures.	

S = Significant
NS = Not Significant
SU = Significant Unavoidable
SC = Significant Cumulative
B = Beneficial
* = Cannot be Determined at This Time

Table S-1: Summary of Potential Environmental Effects and Mitigation Measures
Imperial Project - Proposed Action

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
• The Project would result in the "take" of the federal- and state-listed desert tortoise.	S	4.1.5-23: Applicant shall comply with ~~the applicable provisions of the Federal Endangered Species Act of 1973, California Endangered Species Act of 1984, Native Plant Protection Act of 1977, Migratory Bird Treaty Act, and the Bald Eagle Protection Act.~~ all of the terms and conditions of the Biological Opinion prepared for the Project by the U.S. Fish and Wildlife Service in response to the BLM request for formal consultation pursuant to Section 7 of the Endangered Species Act of 1973, as amended. ~~4.1.5-36:~~4.1.5-35 Incidences of observations of desert tortoises and their sign during activities shall be conveyed to the ~~Project field supervisor~~ FCR during mining actions. Employees shall be notified that they are not authorized to handle or otherwise move any desert tortoises encountered. ~~4.1.5-37:~~4.1.5-36: Tortoises commonly seek shade during the hot portions of the day. During mine project activities, employees shall be required to check under equipment and vehicles prior to moving such. If tortoises are encountered, the vehicle shall not be moved until such animals have voluntarily moved to a safe distance away from the parked vehicle. ~~4.1.5-38: Mining employees shall exercise caution when commuting to the Project area. Speed limits shall be limited to the speed designated by the Imperial County Road Department to minimize the chance for the inadvertent injury or mortality to desert tortoises or other wildlife species encountered on the road. Subject to County approval and BLM concurrence, Applicant shall post speed limit signs along Indian Pass Road.~~	NS

S = Significant
NS = Not Significant
SU = Significant Unavoidable
SC = Significant Cumulative
B = Beneficial
* = Cannot be Determined at This Time

Table S-1: Summary of Potential Environmental Effects and Mitigation Measures
Imperial Project - Proposed Action

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation

~~4.1.5-39:~~4.1.5-37: If desert tortoises must be moved from harm's way during any Project activities, the following procedures shall be implemented by persons authorized by the USFWS to handle desert tortoises:

(1) Desert tortoises shall be handled only by an authorized tortoise handler and only when necessary. New latex gloves shall be used when handling each desert tortoise to avoid the transfer of infectious diseases between animals. Desert tortoises shall be moved the minimum distance possible within appropriate habitat to ensure their safety. In general, desert tortoises shall not be moved in excess of 1,000 feet for adults and 300 feet for hatchlings. An authorized tortoise handler should follow the general handling methods contained in the "Protocols for Handling Live Tortoises" (~~Arizona Game and Fish, *et al*, 1991~~USFWS, 1990).

(2) Desert tortoises that are found above ground and need to be moved from harm's way shall be placed in the shade of a shrub. All desert tortoises removed from burrows shall be placed in an unoccupied burrow of approximately the same size as the one from which it was removed. All excavation of desert tortoise burrows shall be done using hand tools, either by or under the direct supervision of an authorized tortoise handler. If an existing burrow is unavailable, an authorized tortoise handler shall construct or direct the construction of a burrow of similar shape, size, depth, and orientation as the original burrow. Desert tortoises moved during inactive periods shall be monitored for at least two days after placement in the new burrows to ensure their safety. An authorized tortoise handler shall be allowed some judgement and discretion to ensure that survival of the desert tortoise is likely.

(3) If desert tortoises need to be moved at a time of the day when ambient temperatures could harm them (less than 40 degrees F or greater than 90 degrees F), they shall be held overnight in a clean cardboard box. These desert tortoises should be kept in the care of an authorized tortoise handler under appropriate controlled temperatures and released the following day when temperatures are favorable. All cardboard boxes shall be appropriately discarded after one use.

(4) All desert tortoises moved from harm's way shall be marked for future identification. An identification number using the acrylic paint/epoxy covering technique should be placed on the fourth costal scute (USFWS, 1990). No notching should be authorized.

To facilitate clearing the area of desert tortoises, excavation of burrows should begin no more than fourteen (14) days prior to the onset of surface disturbing activities, as long as a final survey is conducted within 24 hours of the onset of activities to ensure that desert tortoises have not returned to the work area.

S = Significant
NS = Not Significant
SU = Significant Unavoidable
SC = Significant Cumulative
B = Beneficial
* = Cannot be Determined at This Time

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation

~~4.1.5-40:~~4.1.5-38: In order to minimize any exposure risk to desert tortoises, a specially designed fence shall be constructed around all portions of the Project area containing pits, ponds, waste rock stockpiles, ore processing areas, maintenance areas, and surface facilities. ~~Fence~~ The final fence design shall be discussed with and found acceptable to the USFWS, BLM, and CDFG. The desert tortoise exclusion fence must meet the following preliminary design specifications:

(1) Fencing shall result in a non-breachable barrier, and its support structure may be comprised of a variety of materials;

(2) Galvanized ¼- to ½-inch diameter mesh and 36-inch wide hardware cloth shall be used; and

(3) The hardware cloth shall be buried 12 inches underground, extend at least 24 inches above the ground, and be firmly attached to the bottom of the perimeter fence and other wildlife exclusion fences.

~~4.1.5-41:~~4.1.5-39: Following fence installation, and prior to initiation of mining, authorized biologists shall conduct a complete (i.e., 100%) survey for desert tortoises within the fenced area. All tortoises found shall be marked and removed from the fenced mine area for safe offsite release within 1,000 feet of the outside of the Project fence using protocols acceptable to the BLM, USFWS, and the CDFG.

~~4.1.5-42:~~4.1.5-40: At the conclusion of Project pre-activity surveys and the relocation of any desert tortoises outside of the Project fence, Applicant and an authorized tortoise handler shall prepare a summary report documenting the desert tortoise protection measures implemented. The summary report shall be submitted to the BLM.

~~4.1.5-43:~~4.1.5-41: Pipeline placement design outside of tortoise-proof fenced project boundaries shall allow for the unimpeded movement of tortoises and other small terrestrial wildlife species.

~~4.1.5-44:~~4.1.5-42: That portion of the transmission line corridor extending outside of the fenced Project mine and process area boundary shall be re-surveyed for desert tortoise burrows and pallets within fourteen (14) days preceding line upgrading/construction. Tortoise burrows and pallets encountered within the construction zone (if any) shall be conspicuously flagged by the surveying biologist(s) and avoided during power pole placement or existing line upgrading. Contingent upon the findings of the pre-survey for the transmission line upgrade/construction, a determination will be made by the BLM as to whether or not on-site desert tortoise monitoring will be required during the transmission line upgrade/construction activities.

S = Significant
NS = Not Significant
SU = Significant Unavoidable
SC = Significant Cumulative
B = Beneficial
* = Cannot be Determined at This Time

Table S-1: Summary of Potential Environmental Effects and Mitigation Measures
Imperial Project - Proposed Action

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
		~~4.1.5-45:~~4.1.5-43: Transmission pole design shall prevent any nesting or perching by ravens, a major predator of young desert tortoises (see also Mitigation Measure ~~4.1.5-33~~4.1.5-32). ~~4.1.5-46:~~4.1.5-44: Notification signs for the desert tortoise and speed limit signs shall be placed and maintained within the Project boundary by Applicant to reduce chances for inadvertent vehicle-induced injury or mortality to desert tortoises and other wildlife species. Applicant, with concurrence of County, shall also place these signs along Indian Pass Road leading to the Project mine and process area. ~~4.1.5-47:~~4.1.5-45: Applicant shall participate in the BLM desert tortoise program for acquiring offsetting lands in compensation for adverse modification of desert tortoise habitat. Under the BLM policy undesignated lands such as the Project area, where tortoises or tortoise sign are located, become Class III tortoise habitat. Within Class III habitat, an offsetting ratio of 1:1 (e.g., one (1) acre of land secured and protectively managed for each acre affected) is applied. Prior to the Record of Decision, Applicant shall determine the feasibility of acquiring 200 acres of suitable desert tortoise habitat which is also microphyll woodland habitat. This 200 acres of desert tortoise/microphyll woodland habitat should be in a location, and of a quality, acceptable to the BLM to concurrently provide mitigation for the loss of desert tortoise and microphyll woodland habitat from the Project area.	

S = Significant
NS = Not Significant

SU = Significant Unavoidable
SC = Significant Cumulative

B = Beneficial
* = Cannot be Determined at This Time

Table S-1: Summary of Potential Environmental Effects and Mitigation Measures
Imperial Project - Proposed Action

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
• The Project will destroy vegetation and wildlife habitat within the Project area.	S	4.1.5-13: Applicant shall implement the ~~site~~ Project Reclamation Plan in conformance with the requirements of the BLM and Imperial County. The Reclamation Plan shall include a program for revegetation of the permanent diversion channels, including the planting of seedlings ~~or~~ of young ironwood and palo verde and seeding of other microphyll vegetation typical of the pre-Project wash habitat (see also Mitigation Measure 4.1.5-17). 4.1.5-14 Applicant shall, as a part of final reclamation, construct one or more big game and/or small game guzzlers within the Project mine and process area in a design and location acceptable to the BLM and the CDFG to enhance the restored site as habitat for deer and other wildlife. Applicant shall obtain the required permit from the BLM prior to guzzler construction. 4.1.5-17: The ~~site~~ Project Reclamation Plan shall include the collection of both fairy duster seeds and winged ~~forget-me-not~~ cryptantha seeds and distribution of the collected seeds of both species within appropriate microhabitats within the Project mine and process area. 4.1.5-18: Applicant shall stockpile available soil from the wash channels to be disturbed within the Project mine and process area and store the soil for subsequent use during site reclamation activities. 4.1.5-19: Applicant shall salvage specimens of selected plant species from the Project mine and process area prior to construction to be utilized during Project reclamation, habitat enhancement activities, or other site reclamation needs. Plant species may include cactus, ocotillo, ironwood, palo verde, or other appropriate species identified by the BLM. 4.1.5-21: Applicant shall implement the revegetation program contained in the ~~site~~ Project Reclamation Plan approved by the BLM and Imperial County. The revegetation program shall include a test plot program, surface contouring and shaping, salvage and distribution of stockpiled soils, collection of a seedbank of seeds from within and in the vicinity of the Project area, preparation of seedbeds, seeding with approved mixtures of native plant species endemic to the area, planting of the plants salvaged from the area prior to mine construction, monitoring for invasion of noxious weeds or salt cedar, and vegetation success monitoring. 4.1.5-22: Applicant shall integrate the revegetation program activities with other site stabilization and restoration activities required by the approved ~~site~~ Reclamation Plan (see also Mitigation Measures 4.1.5-12 and 4.1.5-13).	NS

S = Significant
NS = Not Significant
SU = Significant Unavoidable
SC = Significant Cumulative
B = Beneficial
* = Cannot be Determined at This Time

Table S-1: Summary of Potential Environmental Effects and Mitigation Measures
Imperial Project - Proposed Action

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
• Mine construction and operations could adversely impact vegetation and wildlife dependent on the ephemeral drainage channels which course through the Project area.	S	4.1.5-24: Project actions may also require a dredge and fill permit (404 permit) from the U.S. Army Corps of Engineers (ACOE). A permit is required in the event that proposed activities would entail the dredging or filling of materials into designated waters of the United States. The ACOE shall be contacted by Applicant to determine whether such a permit shall be required prior to the onset of any actions that would disturb site drainages.	NS
		4.1.5-25: The California Regional Water Quality Control Board, Colorado River Basin Region (CRWQCB) shall be notified by the Applicant of Project actions, and Applicant shall comply with CRWQCB requirements for obtaining Waste Discharge Requirements for proposed discharges to land and a general Storm Water Permit.	
		~~4.1.5-34:~~4.1.5-33: Project actions will require the realignment of sections of washes. Applicant shall develop a specific plan for agency approval that ensures maintenance of intermittent flood water flow down these realigned wash channels into unmodified drainage boundaries outside of the Project in order to preserve vegetation and wildlife habitat. Design of these sections of realigned wash shall also include appropriate dimensions and slopes to accommodate continued use by wildlife during mining operations and to facilitate revegetation. A specific plan shall be prepared by Applicant and submitted to the BLM for review prior to the onset of any activities that would result in disturbance to these drainages. Plan design shall include the vegetation of channel bypasses on the site with native species that include ironwood and palo verde in order to maintain continuity of washes, restoration and revegetation of drainages during site reclamation, and planting of ironwoods and palo verde in offsite drainages to enhance wildlife habitat. Any rip rap initially placed along drainages during mining activities shall be removed at the conclusion of mining operations during on-site reclamation.	
• The Project could indirectly impact vegetation and wildlife habitat outside the boundaries of the Project area.	NS	4.1.5-2: Applicant shall prohibit cross-country use of vehicles and equipment except within those portions of the mine and process area subject to surface disturbance.	NS
		~~4.1.5-49:~~4.1.5-47: Firearms and pet dogs shall be prohibited from the mine site.	
• Trash and food scraps generated by the Project could attract additional predators to the Project vicinity.	NS	~~4.1.5-48:~~4.1.5-46: Trash and food items shall be contained in closed containers ~~and removed regularly from the mining site in order~~ to reduce attractiveness to opportunistic predators such as ravens, coyotes, and kit foxes.	NS

S = Significant
NS = Not Significant
SU = Significant Unavoidable
SC = Significant Cumulative
B = Beneficial
* = Cannot be Determined at This Time

	Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
•	Adverse conditions left at the end of the proposed mining operations could be harmful to wildlife.	NS	4.1.5-5: Prior to completion of mining, Applicant shall conduct an assessment of the potential for a pit lake to form in the East Pit. If the assessment indicates a reasonable potential for a pit lake to form, Applicant shall backfill the East Pit to an elevation which would raise the floor of the pit to an elevation higher than the level of any pit lake which may be predicted to form from the inflow of ground water and, thereby, prevent the creation of an attractive nuisance for wildlife. The findings of the pit lake assessment shall be completed and submitted for approval by the BLM prior to the completion of mining activities. 4.1.5-6: Upon completion of mining activities, either a loose rock rubble barricade comprised of large boulders or other suitable material~~, or an alternative method acceptable to the BLM,~~ shall be constructed to prevent vehicular access and limit pedestrian access to the exposed open pit(s) by the public and terrestrial wildlife species. The proposed design for the barricade shall be completed and submitted for approval by the BLM and ICPBD prior to the completion of mining activities. 4.1.5-16: Upon completion of mining activities, Applicant shall remove all equipment and materials from the Project area. All diversion channel lining materials and rip rap shall be removed from the temporary diversion channels.	NS

S = Significant
NS = Not Significant
SU = Significant Unavoidable
SC = Significant Cumulative
B = Beneficial
* = Cannot be Determined at This Time

Table S-1: Summary of Potential Environmental Effects and Mitigation Measures
Imperial Project - Proposed Action

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
Cultural and Paleontological Resources:			
• Potentially significant prehistoric and historic resources were identified during the intensive Class III pedestrian surveys and cultural resources ~~inventory~~ inventories of the Project area and transmission line. Construction of Project facilities could destroy these, and possibly unidentified, cultural resources within the Project area.	S	4.1.6-1: ~~An intensive Class III pedestrian survey and cultural resources inventory of the area in which the junction of Indian Pass Road with Ogilby Road will be realigned, including sufficient buffer areas, must be completed and submitted to the BLM. No notice to proceed for the construction of this junction realignment will be issued under the right-of-way to be granted for Indian Pass until consultation under Section 106 of the Historic Preservation Act for this area is completed.~~ ~~4.1.6-2:~~ A treatment program to recover the scientific information and qualifying values of each identified cultural resource eligible for the NRHP shall be prepared by qualified parties under contract to the Applicant in consultation with the Quechan Tribe and submitted to the BLM for submittal to SHPO for concurrence. Prior to the start of construction of the Project, the accepted treatment program shall be implemented as necessary for the proposed activities. 4.1.6-~~3~~-2: ~~To the extent feasible,~~ Project components to be located in the Project ancillary area shall be sited to avoid direct or indirect impacts to identified NRHP-eligible cultural resources. Prior to commencement of construction of any Project components in the Project ancillary area, specific plans showing the areas intended for surface disturbance shall be submitted to the BLM and BLM approval obtained. 4.1.6-~~4~~-3: Applicant shall designate a project contact representative (PCR) who will be responsible for overseeing Project compliance with the conditions and stipulations for cultural resources. The PCR shall have authority to halt all activities that are in violation of the stipulations. The PCR may be a project manager, company environmental coordinator, or other person identified as responsible by the Applicant. Applicant shall provide the name and contact information of the PCR to the BLM prior to site construction. Should previously unidentified cultural resources be discovered during project operations, Applicant shall immediately cease operations in the immediate vicinity of the discovery and notify the BLM. Operations shall not be reinitiated in the vicinity of the discovery until authorized by the BLM. 4.1.6-4: To the maximum extent feasible, surface disturbance created during construction of the 92 kV/34.5 kV transmission line shall avoid all direct impacts to all identified potentially NRHP-eligible cultural resources. Fencing and monitoring procedures identified in the cultural resource survey for the transmission line for the prevention of indirect impacts to these resources shall also be implemented, unless otherwise directed by the BLM. A right-of-way for those portions of the 92 kV/34.5 kV transmission line located on public lands shall be obtained from the BLM, and specific plans showing the areas intended for surface disturbance shall be submitted to the BLM and BLM approval obtained prior to commencement of any construction of the 92 kV/34.5 kV transmission line.	NS*

S = Significant
NS = Not Significant
SU = Significant Unavoidable
SC = Significant Cumulative
B = Beneficial
* = Cannot be Determined at This Time

Table S-1: Summary of Potential Environmental Effects and Mitigation Measures
Imperial Project - Proposed Action

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
Visual Resources:			
• Night lighting of the Project area could interfere with U.S. military flight training exercises conducted in the area.	NS	4.1.7-1: High intensity lighting used for mining and processing operations at night shall be directed downward to reduce fugitive light. Lighting shall have reflectors or shields to further minimize fugitive light. Light stanchions shall be no higher than necessary for safe and efficient lighting. 4.1.7-5: Applicant shall establish a working relationship with the U.S. Marine Corps (USMC) to ensure that nighttime lighting of mine and process areas does not interfere with nighttime overflight operations within flight corridor VFR-299. As part of this mitigation measure, Applicant shall provide the USMC Air Station, Yuma, Arizona, with a detailed, to-scale, map of the Project area identifying the significant surface facilities, transmission lines, and locations of potential light sources to enable the USMC to avoid these areas during their nighttime flight activities.	NS
• Fugitive dust and particulate matter generated during mine construction and operations could impact visibility in the vicinity of the Project area.	S	4.1.7-3: Dust suppressants shall be utilized, as necessary ~~and in accordance with ICAPCD permit requirements~~, on haul roads to minimize fugitive airborne dust generation on the site.	NS
• Mine construction, operations, facilities, and conditions left at the end of the mining activities would be unattractive and/or conflict with CDCA visual objectives for Class I~~-II~~ areas.	S	4.1.7-2: Following completion of Project mining activities, all buildings, equipment, supplies, and debris shall be removed to improve the visual appearance of the site. 4.1.7-4: In conformance with the Reclamation Plan approved by the BLM and Imperial County, disturbed areas shall be recontoured and reseeded or revegetated with native or indigenous species complementary to vegetation found in the surrounding area.	SU
Noise:			
• Mine construction, mining operations, and subsequent site reclamation activities would generate noise audible outside the Project area.	NS	4.1.8-1: All heavy equipment, drilling rigs, and other internal combustion engines shall be equipped with mufflers to minimize noise generated during construction, operation and reclamation activities. 4.1.8-3: Applicant shall limit blasting activities to daytime hours to minimize nighttime noise disturbance.	NS
• Blasting and other loud noises generated during the mining activities could endanger worker hearing.	S	4.1.8-2: Applicable Occupational Safety and Health Administration (OSHA) worker noise protection requirements, as set forth in 29 CFR 1910.95, *et seq*, and California Occupational Safety and Health Administration (Cal-OSHA) requirements, as set forth in 8 CCR 5095, *et seq*, shall be implemented by the Applicant.	NS

S = Significant
NS = Not Significant
SU = Significant Unavoidable
SC = Significant Cumulative
B = Beneficial
* = Cannot be Determined at This Time

Table S-1: Summary of Potential Environmental Effects and Mitigation Measures
Imperial Project - Proposed Action

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
Land Use:			
• Mining activities would conflict with existing uses of the Project area and vicinity.	S	4.1.9-1: Applicant shall incorporate project design measures to reduce the effects of the Project on air, biological, visual, and noise resources. 4.1.9-4: Applicant shall keep the USMC air station in Yuma, Arizona apprised of the current schedule for blasting at the mine site to minimize the potential for low-flying military aircraft to be in the vicinity of the Project during blasting activities.	NS
• Mining activities could conflict with adopted land use plans or policies for the area.	S	4.1.9-3: Applicant shall conduct mining operations in conformance with the Class L BLM multiple land use ~~objectives~~ guidelines outlined in the CDCA Plan for mining in the area. The Applicant shall also comply with the federal land use requirements prescribed in 43 CFR 3809.	NS
• Conditions left at the end of the mining activities would conflict with existing uses of the Project area and vicinity.	S	4.1.9-2: At the conclusion of mining activities, Applicant shall recontour all disturbed areas except the pit slopes and the waste rock stockpiles as appropriate to create undulating land forms that are stable, safe, do not allow for extensive pooling or ponding, and blend with the surrounding undisturbed topography. ~~slopes on waste rock stockpiles, ore heap, and pit walls to stable and safe surfaces and drainage conditions.~~ Applicant shall also construct a loose rock rubble barricade comprised of large boulders or other suitable material~~, or provide an alternative method acceptable to the BLM~~ to prevent vehicle access and restrict public entry into the ~~East Pit~~ open pit area(s). 4.1.9-5: To facilitate return of the Project area to as near as practical pre-Project condition, Applicant shall, at the end of the active life of the Project, remove the foundations of all facility structures and dispose of the debris at ~~either~~ an offsite waste disposal facility authorized to accept the waste~~ or an onsite, buried disposal site authorized by both the BLM and the CRWQCB~~.	NS
Socioeconomics:			
• The Project would generate up to 100 local job opportunities, spend $48 million in initial capital expenditures, spend $1.7 million per year in continuing capital expenditures, and spend $26 million per year in non-capital expenditures including payroll. The Project would pay sales taxes on expenditures and pay local property taxes on mine assets.	B	No mitigation required.	B

S = Significant
NS = Not Significant

SU = Significant Unavoidable
SC = Significant Cumulative

B = Beneficial
* = Cannot be Determined at This Time

Table S-1: Summary of Potential Environmental Effects and Mitigation Measures
Imperial Project - Proposed Action

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
Roads~~, Utilities,~~ and Public Services:			
• The Project would adversely impact existing local roads serving the Project vicinity.	S	4.1.11.1-1: Applicant shall realign ~~and maintain~~ an approximate 6,000-foot section of Indian Pass Road around the Project mine and process area prior to surface disturbance which would impede through traffic on the road, and shall maintain~~ed~~ Indian Pass Road open to the public during construction of the relocated portion. Applicant shall maintain Indian Pass Road from the intersection with Ogilby Road to a point beyond the Project mine and process area during the active life of the Project in consultation with the Imperial County Public Works Department.	NS
		4.1.11.1-2: Applicant shall not route heavy traffic over Hyduke Road during the transfer of equipment from the Picacho Mine site to the Project area.	
		4.1.11.1-3: Following completion of backfilling of the West Pit, Applicant shall return that section of Indian Pass Road realigned prior to mine construction back to its approximate original alignment and implement site reclamation activities on the realigned segment.	
		4.1.11.1-4: Applicant shall post warning signs at the two (2) wash crossings along the relocated portion of Indian Pass Road warning drivers not to cross the wash when flooded, and shall undertake ~~emergency~~ repairs or maintenance, as may be necessary and authorized by Imperial County, if Indian Pass Road is damaged by flooding where it crosses these washes.	
		4.1.11.1-5: Applicant shall apply water and/or a chemical dust inhibitor acceptable to Imperial County and the BLM to Indian Pass Road from its intersection with Ogilby Road to the boundary of the Project mine and process area.	
		4.1.11.1-6: Applicant shall acquire the necessary approvals of the BLM and Imperial County to construct the relocated section of Indian Pass Road and the realigned intersection of Indian Pass Road and Ogilby Road, and shall design, construct and maintain these facilities in accordance with the conditions of these permits.	
• Mine construction and operations will result in increased traffic over existing roads to the Project area.	NS	4.1.11.1-~~6~~7: Applicant shall encourage employees to carpool to the Project area.	NS

S = Significant
NS = Not Significant

SU = Significant Unavoidable
SC = Significant Cumulative

B = Beneficial
* = Cannot be Determined at This Time

Table S-1: Summary of Potential Environmental Effects and Mitigation Measures
Imperial Project - Proposed Action

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
• New electrical power service will need to be constructed to provided power to the Project mine and process area. In the event of an interruption of utility provided power to the mine, a backup source of power is needed to meet emergency mining operation demand. Privately-owned sections of transmission lines and facilities will subsequently need to be removed at the end of the active life of the mine.	NS	4.1.11.2-1: Applicant shall make available an on-site, diesel-fuel generator to meet emergency power needs for essential loads and services during periods of utility-provided electrical service interruption. 4.1.11.2-34: Applicant shall acquire the necessary approvals of the BLM, Imperial Irrigation District, and other appropriate agencies to construct the 92 kV transmission line over the existing 34.5 kV transmission line, and shall design, construct and maintain this transmission line in accordance with the conditions of these permits, including avoiding the disturbance of any new surface areas during construction. 4.1.11.3-2: When no longer required for Project operations, Applicant shall remove that portion of the 92/~~7.5~~ 7.2 kV transmission line owned by the Project and the electric metering station.	NS
• Mine construction and ancillary activities could result in the destruction of GLO/BLM Cadastral Survey monuments.	NS	4.1.11.3-4: To the extent feasible, all GLO/BLM Cadastral Survey monuments shall be avoided and protected from any accidental damage or destruction. All monuments which may be subject to either intentional or accidental damage or destruction within the Project mine and process area shall be perpetuated by the installation and survey of witness monuments, subject to the prior approval of the survey by the BLM Cadastral Survey and conformance with the applicable California codes.	NS
• There are no sanitation or water utility services available to the Project area to meet sanitation requirements.	S	4.1.11.3-1: Applicant shall provide an on-site septic system for wastewater treatment, which shall be removed upon completion of Project activities. 4.1.11.3-3: Applicant shall obtain necessary permit(s) for on-site sanitary facilities from the Imperial County Department of Health Services.	NS
• Mine communication systems could interfere with military use of the Project area and vicinity.	NS	4.1.11.2-2~~3~~: Applicant shall work with the USMC to ensure that neither the microwave communication system nor the FM Project communication system interfere with military overflight communications.	NS

S = Significant
NS = Not Significant
SU = Significant Unavoidable
SC = Significant Cumulative
B = Beneficial
* = Cannot be Determined at This Time

Table S-1: Summary of Potential Environmental Effects and Mitigation Measures
Imperial Project - Proposed Action

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
Emergency Services and Public Safety:			
• The Project area is remote from emergency police, fire, and medical facilities. In the event of an emergency, these services would be slow to arrive.	S	4.1.12-1: Applicant shall provide appropriate levels of on-site security, fire protection services, and emergency first-aid medical services. 4.1.12-8: Applicant shall prepare an emergency response contingency plan which provides for actions to be taken in the event of an injury accident, hazardous materials release, fire, or other emergency situation. The emergency response contingency plan shall include emergency phone numbers and services available for both surface and air transport of injured employees.	NS
• Large quantities of hazardous substances will be stored and used at the mine. Accidental spills or releases of a hazardous substance could result in a public safety hazard.	S	4.1.12-5: Applicant shall prepare a hazardous material spill/release contingency plan and provide appropriate training to all Project employees on the proper response to potential chemical releases. 4.1.12-6: Applicant shall prepare and maintain a hazardous material business plan in conformance with the requirements of Imperial County. 4.1.12-7: Applicant shall conform with all applicable safety regulations required by the Mine Safety and Health Administration (MSHA), Occupational Safety and Health Administration (OSHA), and California Occupational Safety and Health Administration (Cal-OSHA).	NS
• Project activities during the life of the mine, and the ~~The existence of a~~ remnant pits after the completion of mining, ~~and potential pit lake~~ could attract the public onto the site ~~after mining operations and site reclamation activities have been completed~~. This could result in a public safety problem.	S	4.1.12-2: Applicant shall construct and maintain a fence around the perimeter of the Project mine and process area over the life of the Project. 4.1.12-3: Before removal of the perimeter fence at the end of the active life of the Project, Applicant shall construct a loose rock rubble barricade comprised of large boulders or other suitable material~~, or an alternative method acceptable to the BLM,~~ to prevent vehicle access and limit public access to the exposed open pit(s). 4.1.12-4: Applicant shall post no trespassing and hazardous chemical signs in English and Spanish strategically located along perimeter locations of the Project mine and process area.	NS

S = Significant
NS = Not Significant
SU = Significant Unavoidable
SC = Significant Cumulative
B = Beneficial
* = Cannot be Determined at This Time

Table S-2: Summary of Potential Environmental Effects and Mitigation Measures
Imperial Project - Reduced Project Alternative

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
Geology and Mineral Resources:			
Except for leaving the precious metal resources in the East Pit area unmined, there would be no substantive difference in the impacts of the Reduced Project Alternative on geology and mineral resources from those identified for the Proposed Action.	S	Measures to reduce the effects of the Reduced Project Alternative on geology and mineral resources would be the same as those measures identified for the Proposed Action.	NS
Soil Resources:			
The Reduced Project Alternative would decrease the area of surface disturbance from ~~1,400~~ 1,392 acres to ~~861~~ 853 acres, or an approximate 38 percent reduction in surface area disturbed compared to the Proposed Action. This would translate to an approximate 38 percent reduction in the effects of the Project on soil resources. The potential for other impacts, such as erosion, would be reduced to a similar degree as those identified for the Proposed Action as a result of the elimination and/or reduction of Project facilities.	S	Measures to reduce the effects of the Reduced Project Alternative on soil resources would be the same as those measures identified for the Proposed Action.	NS

S = Significant
NS = Not Significant
SU = Significant Unavoidable
SC = Significant Cumulative
B = Beneficial
* = Cannot be Determined at This Time

Table S-2: Summary of Potential Environmental Effects and Mitigation Measures
Imperial Project - Reduced Project Alternative

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
Hydrology (Surface Water and Ground Water):			
The Reduced Project Alternative would eliminate surface facilities from the northeast portion of the Project area and would not impact the existing surface drainage channels in that area. The East Pit would not be mined and thus there would be no potential for ~~a pit lake~~ seeps in the East Pit; however, the ~~elimination of the East Pit would prevent the backfilling of the~~ West Pit would not be backfilled under the Reduced Project Alternative. While the Singer Pit will not be mined below the ground water elevation, the West Pit is projected to be mined to a depth below the existing ground water level. ~~Although comparisons~~ Comparisons of pit inflow and evaporation rates indicate that it is unlikely for a lake to form in the West Pit, ~~there remains some small possibility for this to occur.~~ and Chemgold has committed to backfilling the West Pit to an elevation that is above the predicted level of any pit lake should a study reasonably determine that a pit lake may form. The Reduced Project Alternative would have an estimated life expectancy of ten (10) years, or one-half of the Proposed Action, and an equivalent decrease in ground water production will result from the shortened Project. However, the rate of drawdown over the Reduced Project Alternative life would be comparable to the Proposed Action. The potential for other surface water and ground water impacts would otherwise be approximately proportional to the decrease in the surface disturbance of the Reduced Project to the Proposed Action.	S	Measures to reduce the effects of the Reduced Project Alternative on surface water and ground water resources would be the same as those measures identified for the Proposed Action.	NS
Air Resources:			
The air resource impacts of the Reduced Project Alternative would be approximately the same as air resource impacts generated by the Proposed Action, except that they would be of a shorter duration (approximately ten (10) years instead of twenty (20) years).	S	Measures to reduce the effects of the Reduced Project Alternative on air resources would be the same as those measures identified for the Proposed Action.	NS

S = Significant
NS = Not Significant
SU = Significant Unavoidable
SC = Significant Cumulative
B = Beneficial
* = Cannot be Determined at This Time

Table S-2: Summary of Potential Environmental Effects and Mitigation Measures
Imperial Project - Reduced Project Alternative

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
Biological Resources:			
The Reduced Project Alternative would diminish the loss of shrub/scrub vegetation from ~~1,300~~ 1,292 acres to approximately ~~810~~ 802 acres, and the loss of shrub/tree vegetation from 100 to approximately 51 acres, as a result of mine construction compared to the Proposed Action. Similarly, the decreased surface area of the Reduced Project Alternative would reduce the wildlife habitat losses of desert succulent scrub habitat to approximately ~~810~~ 802 acres and microphyll woodland habitat to approximately 51 acres. The effects of the Reduced Project Alternative on vegetation and wildlife resources would otherwise be approximately equivalent to those described for the Proposed Action.	S	Measures to reduce the effects of the Reduced Project Alternative on biological resources would be the same as those measures identified for the Proposed Action.	NS
Cultural and Paleontological Resources:			
The Reduced Project Alternative would create approximately 38 percent less surface disturbance than the Proposed Action. However, the density of cultural resources identified within the area of the Project mine and process area which would <u>not</u> be disturbed under the Reduced Project Alternative is substantially lower than in the portion to be disturbed, and few of the identified sites within this undisturbed area have been judged potentially eligible for the NRHP. Therefore, the impacts of the Reduced Project Alternative on cultural resources appear to be only slightly less than the impacts to cultural resources which would result from the implementation of the Proposed Action.	S	Measures to reduce the effects of the Reduced Project Alternative on cultural resources would be the same as those measures identified for the Proposed Action.	~~NS~~*
Visual Resources:			
The effects of the Reduced Project Alternative on visual resources would be approximately equivalent to those identified for the Proposed Action. The shortened project life would allow site reclamation activities to begin ten (10) years sooner. The effects of the Reduced Project Alternative on visual resources would not meet the BLM ~~Class II~~ visual objectives for CDCA Class L limited use areas.	S	Measures to reduce the effects of the Reduced Project Alternative on visual resources would be the same as those measures identified for the Proposed Action.	SU

S = Significant
NS = Not Significant

SU = Significant Unavoidable
SC = Significant Cumulative

B = Beneficial
* = Cannot be Determined at This Time

Table S-2: Summary of Potential Environmental Effects and Mitigation Measures
Imperial Project - Reduced Project Alternative

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
Noise:			
Noise generated by the Reduced Project Alternative would be approximately the same as noise generated by the Proposed Action, although the duration would be reduced by approximately one-half. The effects of the noise generated on potential noise receptors would be approximately the same as that described for the Proposed Action.	NS	Measures to reduce the noise effects of the Reduced Project Alternative would be the same as those measures identified for the Proposed Action.	NS
Land Use:			
Over the active life of the project, the Reduced Project Alternative would have essentially equivalent effects on land use as those described for the Proposed Action. The ten (10)-year, versus twenty (20)-year, life of mining operations under the Reduced Project Alternative would allow for ~~site-~~reclamation activities to be implemented approximately ten (10) years sooner than for the Proposed Action.	S	Measures to reduce the effects of the Reduced Project Alternative on land use would be the same as those measures identified for the Proposed Action.	NS
Socioeconomics:			
The Reduced Action Alternative would generally reduce the positive socioeconomic effects of the Project as compared to the Proposed Action. Employment opportunities for up to 100 employees would be shortened in duration by approximately ten (10) years. Similarly, non-capital expenditures of $26 million per year ($260 million over ten (1)-year shorter operating life) and associated sales taxes in Imperial County of $1.31 million per year ($13.1 million over the ten (10)-year shorter operating life) would be lost. Initial capital expenditures would not change substantially from those projected for the Proposed Action, but annual capital expenditures of approximately $1.7 million ($17.0 million over the ten (10)-year shorter operating life) and associated sales taxes of approximately $0.13 million per year ($1.3 million over the shorter operating life) would also be lost.	B	No mitigation required.	B

S = Significant
NS = Not Significant
SU = Significant Unavoidable
SC = Significant Cumulative
B = Beneficial
* = Cannot be Determined at This Time

Table S-2: Summary of Potential Environmental Effects and Mitigation Measures
Imperial Project - Reduced Project Alternative

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
Roads~~, Utilities,~~ and Public Services:			
The Reduced Project Alternative will have approximately the same effects on roads, utilities, and public services as would the Proposed Action. The principal differences would be the shortened project life (ten (10) years compared to twenty (20) years), and the inability to backfill the West Pit with mined ~~backfill~~ material because the East Pit will not be mined. Because the West Pit will not be backfilled~~, and because of its proximity to~~ Indian Pass Road, the road will not be returned to ~~its original alignment~~ to the east side of the west diversion at the end of mining operations as indicated in the Proposed Action.	S	Measures to reduce the effects of the Reduced Project Alternative on roads, utilities, and public services would be the same as those measures identified for the Proposed Action.	NS
Emergency Services and Public Safety:			
Over the active life of the Reduced Project Alternative, it will have approximately the same effects on emergency services and public safety as would the Proposed Action.	S	Measures to reduce the effects of the Reduced Project Alternative on emergency services and public safety would be the same as those measures identified for the Proposed Action.	NS

S = Significant
NS = Not Significant
SU = Significant Unavoidable
SC = Significant Cumulative
B = Beneficial
* = Cannot be Determined at This Time

Table S-3: Summary of Potential Environmental Effects and Mitigation Measures
Imperial Project - Complete Pit Backfilling Alternative

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
Geology and Mineral Resources:			
Except for the backfilling of the open pits, there would be no substantive difference in the impacts of the Complete Pit Backfill Alternative on geology and mineral resources from those identified for the Proposed Action. However, mineral resources exposed at the bottom of open pits which are not commercially minable under current economic conditions would be unavailable for subsequent mining without potentially cost-prohibitive removal of the backfilled waste rock.	S	Measures to reduce the effects of the Complete Pit Backfill Alternative on geology and mineral resources would be the same as those measures identified for the Proposed Action.	NS
Soil Resources:			
The Complete Pit Backfill Alternative will result in the same impacts on soil resources as described by the Proposed Action. With the backfilling of waste rock and closure of all of the open pits, the effects of surface erosion within the Project area would be expected to decrease slightly compared to those effects identified for the Proposed Action.	S	Measures to reduce the effects of the Complete Pit Backfill Alternative on soil resources would be the same as those measures identified for the Proposed Action.	NS
Hydrology (Surface Water and Ground Water):			
The effects of the Complete Pit Backfill Alternative on surface and ground water resources would remain generally the same as those effects described for the Proposed Action. However, the Complete Pit Backfill Alternative would completely eliminate the remote potential for accumulation of ground water in the East Pit and Singer Pit as described by the Proposed Action.	S	Measures to reduce the effects of the Complete Pit Backfill Alternative on surface water and ground water resources would be the same as those measures identified for the Proposed Action.	NS
Air Resources:			
The air resource impacts of the Complete Pit Backfill Alternative would be essentially the same as air resource impacts generated by the Proposed Action, except that they would be of a longer duration.	S	Measures to reduce the effects of the Complete Pit Backfill Alternative on air resources would be the same as those measures identified for the Proposed Action	NS

S = Significant
NS = Not Significant
SU = Significant Unavoidable
SC = Significant Cumulative
B = Beneficial
* = Cannot be Determined at This Time

Table S-3: Summary of Potential Environmental Effects and Mitigation Measures
Imperial Project - Complete Pit Backfilling Alternative

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
Biological Resources:			
The effects of the Complete Pit Backfill Alternative on biological resources would be essentially the same as those described for the Proposed Action. The Complete Pit Backfill Alternative would eliminate the ~~remote~~ potential for ~~a pit lake to be created~~ seeps to form in the East Pit, as described by the Proposed Action, and would eliminate the potential for creating artificial wetland area. The Complete Pit Backfill Alternative would extend the on-site occupation and potential impacts to wildlife for up to an additional five (5) plus years while backfilling operations are being conducted. Following backfilling and ~~site~~ reclamation activities, fences would be removed and, after an indefinite period, the entire Project area would eventually return to desert wildlife habitat as natural revegetation and restoration processes evolve.	S	With exception of eliminating unnecessary measures to manage wildlife access to the East Pit and Singer Pit ~~potential pit lake,~~ the measures to reduce the effects of the Complete Pit Backfill Alternative on biological resources would be the same as those measures identified for the Proposed Action.	NS
Cultural and Paleontological Resources:			
The Complete Pit Backfill Alternative will result in identical impacts on cultural resources to those created by the Proposed Action.	S	Measures to reduce the effects of the Complete Pit Backfill Alternative on cultural and paleontological resources would be the same as those measures identified for the Proposed Action.	~~NS~~*
Visual Resources:			
The effects of the Complete Pit Backfill Alternative on visual resources would be approximately equivalent to those identified for the Proposed Action over the active life of the Project. Human occupation and activities would be visually evident for up to an additional five (5) plus years while backfilling operations were conducted. However, backfilling operations would reduce the size of the waste rock stockpiles and return the landscape to a topographic condition more similar to the pre-Project status than the Proposed Action.	S	Measures to reduce the effects of the Complete Pit Backfill Alternative on visual resources would be the same as those measures identified for the Proposed Action.	SU

S = Significant
NS = Not Significant
SU = Significant Unavoidable
SC = Significant Cumulative
B = Beneficial
* = Cannot be Determined at This Time

Table S-3: Summary of Potential Environmental Effects and Mitigation Measures
Imperial Project - Complete Pit Backfilling Alternative

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
Noise:			
Noise generated by the Complete Pit Backfill Alternative would be approximately the same as noise generated by the Proposed Action, and the effects of the noise generated on potential noise receptors would also be approximately the same as that described for the Proposed Action. However, backfilling operations would extend the period during which noise is generated in the Project area by up to an additional five (5) plus years.	NS	Measures to reduce the noise effects of the Complete Pit Backfill Alternative would be the same as those measures identified for the Proposed Action.	NS
Land Use:			
Over the active life of the Project, the Complete Pit Backfill Alternative would have essentially equivalent effects on land use as those described for the Proposed Action. Backfilling operations would extend the period of time during which dispersed recreation and other uses in the vicinity would be excluded from the Project mine and process area or be indirectly affected. However, the long-term barricading of the East Pit and Singer Pit areas would be subsequently unnecessary and would allow public access to the entire Project area following backfilling and site reclamation activities.	S	Measures to reduce the effects of the Complete Pit Backfill Alternative on land use would be the same as those measures identified for the Proposed Action.	NS
Socioeconomics:			
The Complete Pit Backfill Alternative would have the same positive socioeconomic effects as the Proposed Action over the life of the mining operations. In addition, a smaller staff of workers would be employed or contracted for the up to five (5) plus-year period needed to complete the backfilling operations, and expenditures of approximately $125 would be required to backfill the pit(s). Because the cost of backfilling exceeds the anticipated return on the Project, such a project would not be pursued by a prudent project developer. ~~However, the cost of backfilling is estimated at $136 million.~~	B	No mitigation required.	B

S = Significant
NS = Not Significant
SU = Significant Unavoidable
SC = Significant Cumulative
B = Beneficial
* = Cannot be Determined at This Time

Table S-3: Summary of Potential Environmental Effects and Mitigation Measures
Imperial Project - Complete Pit Backfilling Alternative

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
Roads~~, Utilities,~~ and Public Services:			
The Complete Pit Backfill Alternative will have approximately the same effects on roads, utilities, and public services as would the Proposed Action. However, the access roads to the Project area will continue to be utilized during the up to five (5)-year plus period needed to backfill the pits.	S	Measures to reduce the effects of the Complete Pit Backfill Alternative on roads, utilities, and public services would be the same as -those measures identified for the Proposed Action.	NS
Emergency Services and Public Safety:			
Over the active life of the Complete Pit Backfill Alternative, it will have approximately the same effects on emergency services and public safety as would the Proposed Action. However, the Complete Pit Backfill Alternative will result in the backfilling of all of the pits within the Project mine and process area and would, thereby, totally eliminate the potential safety hazard from the public entering the Project mine and process area to access the unfilled East Pit and Singer Pit.	S	Except for the eliminating the need to barricade the unfilled East Pit and Singer Pit to restrict access after the completion of backfilling and site reclamation operations, the measures to reduce the effects of the Complete Pit Backfill Alternative on emergency services and public safety would be the same as those measures identified for the Proposed Action.	NS

S = Significant
NS = Not Significant
SU = Significant Unavoidable
SC = Significant Cumulative
B = Beneficial
* = Cannot be Determined at This Time

Table S-4: Summary of Potential Environmental Effects and Mitigation Measures
Imperial Project - No Action Alternative

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
Geology and Mineral Resources:			
No adverse impacts on geology or mineral resources would result from the No Action Alternative. The disapproval of the proposed Imperial Project could discourage future proposals for mining of, and/or maintaining claims for, the precious mineral resources within the Project area.	*NS	No mitigation required.	*NS
Soil Resources:			
No adverse impacts on soil resources in the Project area would result from the No Action Alternative.	*NS	No mitigation required.	*NS
Hydrology (Surface Water and Ground Water):			
No adverse impacts on surface water or ground water resources in the Project area would result from the No Action Alternative.	*NS	No mitigation required.	*NS
Air Resources:			
No adverse impacts on air resources within, or in the vicinity of, the Project area would result from the No Action Alternative.	*NS	No mitigation required.	*NS
Biological Resources:			
No adverse impacts on biological resources within, or in the vicinity of, the Project area would result from the No Action Alternative.	*NS	No mitigation required.	*NS
Cultural and Paleontological Resources:			
No adverse impacts on cultural or paleontological resources within, or in the vicinity of, the Project area would result from the No Action Alternative.	*NS	No mitigation required.	*NS
Visual Resources:			
No adverse impacts on visual resources would result from the No Action Alternative.	*NS	No mitigation required.	*NS

S = Significant
NS = Not Significant
SU = Significant Unavoidable
SC = Significant Cumulative
B = Beneficial
* = Cannot be Determined at This Time

Table S-4: Summary of Potential Environmental Effects and Mitigation Measures
Imperial Project - No Action Alternative

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
Noise:			
No adverse noise impacts would result from the No Action Alternative.	*NS	No mitigation required.	*NS
Land Use:			
With the probable exception of the discontinuance of mining exploration activities, the existing land use within, and in the vicinity of, the Project area would be unaffected by the No Action Alternative.	*NS	No mitigation required.	*NS
Socioeconomics:			
The No Action Alternative would not create the 100 job opportunities nor the annual payroll from the proposed Project. The No Action Alternative would also result in the loss of the $48 million initial capital expenditures, $1.7 million annual capital expenditures, and the $26 million per year non-capital expenditures and associated taxes and benefits to the local economy projected by the Imperial Project.	*NS	No mitigation required.	*NS
Roads~~, Utilities,~~ and Public Services:			
No adverse impacts on roads, utilities, or public services within, or in the vicinity of, the Project area would result from the No Action Alternative.	*NS	No mitigation required.	*NS
Emergency Services and Public Safety:			
No adverse impacts on emergency services or public safety provided to, or in the vicinity of, the Project area would result from the No Action Alternative.	*NS	No mitigation required.	*NS

S = Significant
NS = Not Significant

SU = Significant Unavoidable
SC = Significant Cumulative

B = Beneficial
* = Cannot be Determined at This Time

IMPERIAL PROJECT
DRAFT ENVIRONMENTAL IMPACT STATEMENT/
ENVIRONMENTAL IMPACT REPORT

TABLE OF CONTENTS

Page

Page

Page

Page

Page

Page

Page

Page

Page

Page

LIST OF FIGURES

LIST OF TABLES

Page

LIST OF APPENDICES

1. INTRODUCTION

Chemgold, Inc. (Chemgold) has proposed the development of the Imperial Project (Project), an open-pit, heap leach, precious metal mine and processing facility located in eastern Imperial County, California which would utilize conventional heap leach mining methods to extract gold and silver from the mined ore (see Chapter 10 for a glossary, list of acronyms, and for definitions of selected terms). The Project would include: mining gold and silver ore and waste rock at a maximum average operating rate of 130,000 tons per day for up to twenty (20) years; constructing and operating facilities to administer the operation; maintenance of all mining and related equipment; processing the ore and stockpiling the waste rock; developing and producing ground water for use in processing operations; performing continuing mineral exploration activities; implementing environmental impact reduction measures; and implementing site reclamation measures. The proposed Project has been designed to meet the anticipated permit requirements of the various federal, state and local agencies which regulate mining in the area.

Up to 150 million tons of ore would be leached on the heap leach pad. At a waste-to-ore (waste:ore) ratio of up to 3:1, up to 450 million tons of waste rock would be deposited in the waste rock stockpiles or the mined-out portions of the open pits. Mining activities, performed 24 hours per day and seven (7) days per week, would commence in 1997, after the acquisition of all required approvals, and would terminate in approximately the year 2016.

This Environmental Impact Statement/Environmental Impact Report (EIS/EIR) is being jointly prepared by the Bureau of Land Management (BLM), which is the Lead Agency with respect to compliance with the National Environmental Policy Act (NEPA) and its implementing regulations, and the Imperial County Planning~~ and ~~/Building Department (ICPBD), which is the Lead Agency responsible for compliance with the California Environmental Quality Act (CEQA). This EIS/EIR has been prepared as two (2) separate volumes, which together comprise the entire document. Volume I of this document contains the Summary, the Table of Contents, ~~main text, consisting of~~ Chapters 1 through 11, and Appendix A (the Imperial Project Reclamation Plan). ~~; and~~ Volume II~~, which~~ contains all of the other appendices.

1.1. Purpose and Need for the Project

The Bureau of Land Management (BLM) is responsible for administering mineral rights access on federal lands as authorized by the General Mining Law of 1872. Under this law, qualified prospectors are entitled to reasonable access to mineral deposits on public domain lands.

The purpose of the Project is to develop and operate a mine to recover the gold and silver ore resources identified on mining claims which have been staked or acquired by Chemgold, Inc. under the General Mining Law of 1872. Chemgold's objective for the Project is to profitably recover precious metals (gold and silver) from these staked mining claims to the optimal extent possible, and reclaim the Project area in a manner that is environmentally responsible and in substantial compliance with United States mining laws, the California Desert Conservation Area (CDCA) Plan, the Federal Land Policy and Management Act (FLPMA), the California Surface Mining and Reclamation Act (SMARA) and Imperial County's implementing regulations, and other applicable laws and regulations. The need is to meet the prevailing market demand for gold and silver.

The purpose of this EIS/EIR is to analyze the impacts of the proposed Project, including the identified reasonable alternatives, so that decision-makers will have adequate information upon which to base their decision to approve or deny the Project or alternative development scenarios.

1.2. Project Location

The Project is located in eastern Imperial County, California, approximately 45 miles northeast of El Centro, California and 20 miles northwest of Yuma, Arizona (Figure 1-1). The Project is located within Sections 28, 29, 30, 31, 32 and 33, Township 13 South, Range 21 East, and Sections 4, 5, 6, 7, and 8, Township 14 South, Range 21 East, San Bernardino Baseline & Meridian (SBB&M), on public lands administered by the Bureau of Land Management (BLM). The boundary of the Project mine and process area is presented in Figure 1-2.

Access to the Project area is from Ogilby Road via Interstate 8 from the south, or from State Route 78 to the north. The Project mine and process area overlaps Imperial County-maintained Indian Pass Road, and is located approximately five (5) miles northeast of the Indian Pass Road/Ogilby Road intersection.

The Project mine and process area boundary encompasses approximately ~~1,612~~ 1,589 acres on a broad, south- and west-facing, alluvial plain south of Indian Pass in the Chocolate Mountains, between the Cargo Muchacho Mountains, approximately four (4) miles south, and Peter Kane Mountain, approximately six (6) miles north. The elevation over the Project mine and process area ranges from about 760 feet to 925 feet. The Project lies near the center of the mining district formed by the active Picacho, Mesquite, and American Girl heap leach gold mines, each located approximately 10 miles from the Project mine and process area.

Figure 1-1: Imperial Project General Location Map

Figure 1-2: Imperial Project Vicinity Map

1.3. Principal Agency Policies and Authorizing Actions

1.3.1. Bureau of Land Management

This EIS/EIR was prepared in conformance with the policy guidance provided in BLM's National Environmental Policy Act (NEPA) Handbook (BLM Handbook H-1790-1). The handbook provides instructions for compliance with the Council on Environmental Quality's (CEQ's) regulations for implementing the procedural provisions of NEPA and the Department of Interior's manual guidance on NEPA (516 DM 1-7).

The BLM NEPA handbook also provides guidance on monitoring. Three (3) distinct purposes of monitoring are identified and, if the Project is approved, would be applicable, including:

(1) Compliance Monitoring: As part of the Record of Decision (ROD) on the Project, committed mitigation measures and related monitoring and enforcement activities, if any, for the selected alternative will be identified. Stipulations which will become part of the BLM's authorization will be attached to the ROD or incorporated by reference from this EIS/EIR or other applicable requirements. Any measures to avoid or reduce environmental harm identified in this EIS/EIR which are not adopted will also be identified with an explanation of why the measures were not adopted. NEPA requires that decisions on a project be implemented in accordance with the ROD. The BLM will perform compliance monitoring to ensure that actions taken comply with the terms, conditions, and mitigation measures identified in the ROD.

(2) Effectiveness or Success Monitoring: Determining if decisions made in the ROD are achieving intended environmental objectives may require monitoring the effectiveness or success of the actions or decisions. Effectiveness monitoring is not required by NEPA unless specified in the ROD. However, monitoring requirements specified in this EIS/EIR will be incorporated into the ROD. Effectiveness monitoring will typically be required to determine the effectiveness or success of identified mitigation measures.

(3) Evaluation of Validity Monitoring: Monitoring to determine if a decision continues to be correct or appropriate over time is another purpose of monitoring. Evaluation of decision validity monitoring is not required by NEPA, and it is usually not routinely needed for all decisions covered by an EIS. Evaluation monitoring goes beyond effectiveness monitoring and focuses on examining the validity of the environmental objectives. Evaluation monitoring would be used to determine if the terms, conditions, and mitigation measures prescribed by the

ROD are still needed to achieve environmental objectives, or if they are greater than necessary or less than necessary to achieve environmental objectives.

Surface Management Authorizations and Relevant Plans:

BLM regulations for surface management of public land being mined under the general mining law (43 CFR 3809) recognize the statutory right of mineral claim holders such as Chemgold to explore for, and develop, federal mineral resources, and encourages such development. These federal regulations require the BLM to review proposed operations to ensure that: (1) adequate provisions are included to prevent unnecessary or undue degradation of public lands; (2) measures are included to provide for reclamation; and (3) the proposed operations comply with other applicable federal, state and local laws and regulations. Chemgold has submitted to the BLM a proposed Plan of Operations (POO) as required under these regulations.

The Project would be located within the California Desert Conservation Area (CDCA), which has been identified by Congress in the Federal Land Policy and Management Act of 1976 (FLPMA) as a unique area in need of special management by the BLM. Use of the lands and natural resources within the CDCA are guided by the 1980 CDCA Plan (as amended). All of the Project area would be located within multiple use Class L - Limited Use, which is the second-most restrictive of the four (4) classifications. Management of Class L areas is "oriented towards giving priority protection to sensitive natural, scenic, ecological, and cultural resources while placing limitations on other uses that may conflict with or degrade these values." (USDI, 1980)~~.~~ The multiple use guidelines adopted for implementing the CDCA Plan in Class L lands recognize that locatable mineral operations are non-discretionary, but state that the development of locatable minerals on Class L lands will be limited to activities necessary to achieve extraction with minimum environmental impact, using best available mitigation technology and most effective feasible reclamation practices. The Proposed Action would be in conformance with the CDCA and the multiple use class guidelines applicable for this classification.

Site Reclamation Requirements:

The Mining and Mineral Policy Act of 1970 (MMPA) mandates that federal agencies ensure that closure and reclamation of mine operations be completed in an environmentally responsible manner. The MMPA states that the federal government should promote the:

> "... development of methods for the disposal, control, and reclamation of mineral waste products, and the reclamation of mined lands, so as to lessen any adverse impact of mineral extraction and processing upon

the physical environment that may result from mining or mineral activities."

The BLM's long-term reclamation goals are to shape, stabilize, revegetate, or otherwise treat disturbed areas in order to provide a self-sustaining, safe, and stable condition that provides a productive use of the land which conforms to the approved land-use plan for the area. The short-term reclamation goals are to stabilize disturbed areas and to protect both disturbed and adjacent undisturbed areas from unnecessary or undue degradation. Relevant BLM policy and standards for reclamation are set forth in the BLM Solid Minerals Reclamation Handbook (BLM Manual Handbook H-3042-1) which provides consistent reclamation guidelines for all solid non-coal mineral activities conducted under the authority of the BLM minerals regulations in Title 43 of the Code of Federal Regulations (BLM, 1992a). The BLM ~~will review~~ has reviewed the site reclamation portions of the Chemgold Imperial Mine POO to ensure that the Project would meet BLM's reclamation standards and goals (see Appendix A).

Cyanide Management Plan Requirements:

The BLM's national cyanide management policy requires the BLM state offices to prepare a Cyanide Management Plan. The California State Office of the BLM prepared and administers the California Cyanide Management Plan (BLM, 1992b). The plan is applicable to all public lands administered by the BLM in California, and it would be applicable to the proposed Imperial Project cyanide heap leaching and relevant precious metal recovery processes. The plan provides guidance on cyanide use in mining activities and lists the following objectives:

(1) Implement the BLM's national cyanide management policy;

(2) Ensure that mining operations using cyanide on BLM managed lands follow best management practices and do not cause unnecessary or undue degradation of the federal lands;

(3) Provide both the mine operator and the BLM technical staff with standards for development and evaluation of mining projects that use cyanide; and

(4) Use State Standards, if established.

The plan is not intended to duplicate requirements of other federal or state agencies with responsibility for managing the use of cyanide in mining operations. Where standards are established for mining operations by a responsible California Regional Water Quality Control Board (CRWQCB), such standards shall apply when reviewing

a notice or a POO. BLM ~~will review~~ has reviewed the Chemgold Imperial Project POO to ensure that it is in conformance with the California Cyanide Management Plan.

1.3.2. Imperial County

The state-mandated Imperial County General Plan (General Plan) was developed to create a balanced, comprehensive guide for future physical growth of lands within the County, and provide mechanisms to achieve the County's desired goals and objectives (County of Imperial, 1993e). The General Plan strives towards achieving a balance between development and economic, social, and environmental resources. The General Plan consists of nine (9) elements: Land Use, Housing, Circulation and Scenic Highways, Noise, Seismic and Public Safety, Agriculture, Conservation and Open Space, Geothermal and Transmission Resources, and Water Resources (County of Imperial, 1993e).

The Project is located entirely on federal public lands managed by the BLM. As such, Imperial County land use zoning requirements may not be strictly binding. However, the Project is required to comply with the California Surface Mining and Reclamation Act of 1975 (SMARA) and the applicable California Department of Conservation regulations, as implemented by the County of Imperial through the Planning ~~and~~ /Building Department. These regulations relate to: mining operation and closure; end land use; environmental setting/fish and wildlife habitat; geotechnical requirements; erosion and sediment control; resoiling and revegetation; and administrative requirements. Approval of the Project's proposed methods of compliance with SMARA must be obtained from Imperial County prior to the commencement of construction, and the County may adopt conditions to the approval of the Reclamation Plan.

Current Imperial County Ordinances also require the approval of a Conditional Use Permit (CUP) prior to commencing the drilling of the ground water production wells ~~of the size~~ proposed by Chemgold.

1.3.3. Authorizing Actions

Based upon information received during the scoping process and during subsequent discussions with various agencies, certain authorizing actions have been identified as required, or probably required, prior to construction or operation of the Project. A list of these authorizing actions, organized by agency, is provided in Table 1-1.

1.4. Intended Uses of this EIS/EIR

The purpose of this joint EIS/EIR is to provide the decision-makers in all agencies required to approve authorizing actions (see Section 1.3.3) with sufficient information to: (1) make informed decisions regarding the anticipated significant impacts of the Proposed Action; and (2) determine if possible mitigation measures or alternatives are available which could reduce those identified impacts of the Proposed Action to below the level of significance. The joint EIS/EIR is also intended to provide this same information to the concerned public and solicit their comments.

1.5. Public Scoping and Consultation

A Notice of Intent (NOI) to prepare an EIS was published in the Federal Register on March 24, 1995. A Notice of Preparation (NOP) of an EIR was distributed by Imperial County on April 5, 1995. A copy of the NOI, the NOP, and the NOP distribution list are included in this EIS/EIR in Appendix ~~A~~ B. As a result of distribution of the NOI and the NOP, a total of 16 comment letters were received which addressed both specific and general issues regarding the Project. These comments have also been attached to this EIS/EIR in Appendix ~~A~~ B.

Two (2) public scoping meetings were held prior to the preparation of the Draft EIS/EIR to receive public comments, identify concerns, and evaluate viable alternatives. The first public meeting was held at the El Centro Community Center on April 17, 1995. The second public meeting was held at the Yuma Days Inn Suites on April 18, 1995. A total of ~~approximately 30~~ 11 members of the public attended these meetings, during which four (4) comments were offered. A summary of the issues discussed at these scoping meetings is attached to this EIS/EIR in Appendix ~~A~~ B. The contents of this EIS/EIR respond to the issues raised during the scoping process.

Table 1-1: Agency Authorizing Actions Required for the Imperial Project

AGENCY		PERMIT NAME
Bureau of Land Management	El Centro Resource Area	Approve Plan of Operations for mine and process operations
		Approve Right-of-Way for existing and relocated sections ~~Relocation~~ of Indian Pass Road
		Approve Right-of-Way for new and rebuilt transmission lines and water wells and pipeline
		Complete Nation-to-Nation consultation with the Quechan Tribe
		Issue Record of Decision in conformance with the National Environmental Policy Act
United States Fish and Wildlife Service		Issue Opinion in Formal Consultation with BLM under Section 7 of the federal Endangered Species Act
United States Army Corps of Engineers		~~Notification of Nationwide Permit Use~~ Approve Individual Clean Water Act Section 404 Permit
Bureau of Alcohol, Tobacco and Firearms		Approve Use~~r~~ of High Explosives Permit
California Regional Water Quality Control Board	Colorado River Basin Region	Approve Waste Discharge Requirements for discharges of waste to land
		Approve~~d~~ National Pollutant Discharge Elimination System Permit (NPDES) for Storm Water Discharge During Construction
		Approve National Pollutant Discharge Elimination System Permit (NPDES) for Storm Water Discharge from Industrial Facilities
		Approve Certification of Compliance with Section 401 of the federal Clean Water Act
California Department of Fish and Game		Approve California Endangered Species Act (Fish and Game Code Section 2081) Management Permit
		Approve Stream or Lake Alteration Agreement (Fish and Game Code Section 1601 or 1603)
California State Office of Historic Preservation		Section 106 Process
Imperial County	Planning and Building Department	Approve Conditional Use Permit for drilling ground water production wells
		Approve Reclamation Plan and Interim Management Plan for Project mine and process area facilities
		Certify Final Environmental Impact Report in conformance with the California Environmental Quality Act
		Approve Building Permits and Certificate of Occupancy
	Department of Health Services	Approve Individual Septic Disposal System Permit
		Approve Water System Permit
	Air Pollution Control District	Approve Authority to Construct to construct for applicable air pollution emission units
		Approve Permit to Operate to operate applicable air pollution emission units
	Department of Public Works	Approve Encroachment Permit for Project access off, and relocation of, Indian Pass Road
	Board of Supervisors	Approve Revocation of Road for Project relocation of Indian Pass Road
	Fire Department	Approve Plan Review for conformance with Uniform Fire Code

2. ALTERNATIVES INCLUDING THE PROPOSED ACTION

This chapter has been prepared in conformance with the standard recommended format found in 40 CFR 1502.10(e) and 40 CFR 1502.14, and the CEQA guidelines (14 CCR 15124 and 14 CCR 15126(d)). The following sections describe the Proposed Action; alternatives to the Proposed Action, including the No Action Alternative; and alternatives eliminated from detailed analysis. Alternatives selected by the Lead Agencies for consideration in this EIS/EIR are based on potential impacts associated with the Proposed Action and issues identified through the scoping process.

Alternative design and processes to the Proposed Action were developed through initial project scoping, consultation with other agencies and the public, and by the Imperial County Planning/Building Department and the BLM. Alternatives to be considered under NEPA and CEQA are those which could feasibly attain the Imperial Project's objectives and are capable of either eliminating any of the significant adverse environmental effects of the Proposed Action or reducing them to a level of insignificance (even if such alternatives would be more costly or, to some degree, would impede the project's objectives). The range of alternatives is also guided by the "rule-of-reason." Alternatives are developed to satisfy an identified purpose or need, or in resolving issues presented as a result of the environmental review process. The EIS/EIR is required to explore and evaluate possible alternatives and, if an alternative is found to be infeasible or unreasonable and, thus, not considered further, the EIS/EIR must briefly explain the reasons for elimination.

The Imperial Project (Project) is a proposal to develop an open-pit precious metal mining operation utilizing heap leach processes. Up to 150 million tons of ore would be leached and 450 million tons of waste rock would be deposited at the proposed waste rock stockpiles or the mined-out portions of the three (3) planned open pits. Facilities to administer the operation, maintain all mining and related equipment, process the ore, and stockpile waste rock would also be constructed. A ground water production well field, consisting of up to four (4) ground water production wells, would be completed and used to provide water for processing operations, dust control and domestic uses. Additional mineral exploration activities would be conducted to seek future ore reserves within the Project mine and process area. Environmental impact reduction measures and reclamation activities would be performed to minimize or eliminate potential environmental impacts.

2.1. Proposed Action

2.1.1. Introduction

The Project is a proposed open-pit, heap leach, precious metal mine which would utilize conventional heap leach mining methods. The Project would include: mining gold and silver ore and waste rock at a maximum average operating rate of 130,000 tons per day for up to twenty (20) years; constructing facilities to administer the operation; maintenance of all mining and related equipment; processing the ore and stockpiling the waste rock; developing and producing ground water for use in processing operations; ~~performing continuing~~ conducting exploration activities; implementing environmental impact reduction measures; and implementing site reclamation measures. The proposed Project has been designed to meet the anticipated permit requirements of the various federal, state and local agencies which regulate mining ~~in the area~~.

The proposed Project would consist of the following components:

- Three (3) open pits, identified as the West Pit, East Pit and Singer Pit, and one (1) Mineralized Potential Area, co-joining the three (3) separate pits;

- ~~Four (4)~~ Three (3) waste rock stockpiles;

- Four (4) soil stockpile sites~~.~~;

- One (1) administration office and maintenance facility area;

- Ore processing facilities;

- One (1) precious metal recovery plant and other related facilities;

- A system of roads internal to the Project ~~site~~ mine and process area which would connect the various facility components;

- One (1) electrical power substation, an electrical metering station, a 4.5-mile section of new 92/~~7.5~~ 7.2 Kv transmission line, and a 16-mile existing utility-owned 34.5 kV transmission line which would be "overbuilt" with a new utility-owned 92 kV transmission line~~.~~;

- One (1) ground water well field, consisting of up to four (4) production wells, designed to produce ground water at a peak rate of approximately

1,000 gallons per minute (gpm) and peak yield of approximately 1,200 acre feet per year (afy), and an associated water pipeline; and

- Relocated portions of Indian Pass Road, including realignment of the intersection of Indian Pass Road and Ogilby Road and the relocation of an approximately 6,000-foot portion of Indian Pass Road, which would be moved approximately 1,000 feet to the west of its current location to provide continuing public access to areas northeast of the Project.

Up to 150 million tons of ore would be leached under the Proposed Action. At a waste:ore ratio of up to 3:1, up to 450 million tons of waste rock would be deposited in the waste rock stockpiles or the mined-out portions of the open pits. Mining activities, performed 24 hours per day and seven (7) days per week, would commence in early 1997~~,~~ and would terminate by approximately the year 2016.

As discussed throughout this document, the "Project area" consists of a "Project mine and process area" and a "Project ancillary area." The Project mine and process area would contain all of the open pits, waste rock stockpiles, soil stockpiles, administration office and maintenance facility area, heap leach facility, precious metal recovery plant and other facilities, and internal roads. The Project ancillary area would include the ground water production wells and water pipeline, the electrical power metering station and new 92 kV transmission line, and the relocated portions of Indian Pass Road. ~~Since the~~ The "rebuilt" utility-owned 92 kV transmission line ~~would not create any new surface disturbance, but would only redisturb during construction areas which had been previously disturbed by the original construction of the transmission line, it~~ is not included as part of the Project area when discussed in this document, but ~~it~~ is separately described as the "rebuilt" or "overbuilt" 92 kV transmission line.

Figure 2-1 shows the boundaries of the Project mine and process area and a shaded area indicating the Project ancillary area. The locations of the major facilities proposed within the Project mine and process area are presented in Figure 2-2. The proposed Project would create a maximum of approximately ~~1,400~~ 1,392 acres of new surface disturbance, all within the Project area. An itemized list of surface disturbance for each of the major Project facilities, together with the undisturbed acreage within the Project mine and process area and Project ancillary area, is presented in Table 2-1.

Figure 2-1: Imperial Project Facility Locations

Figure 2-2: Imperial Project Mine and Process Area Facilities

2.1.2. Construction

The construction of the Project facilities would commence once necessary approvals are obtained from the appropriate regulatory agencies. The initial construction phase of the Project would take up to six (6) months. Additional construction activities would also occur during the mine life, particularly during the completion of the later phases of the heap leach pad construction (see Section 2.1.8.1). Equipment necessary for construction activities would include a portable screen plant and crusher, scrapers, dozers, rollers, graders, portable generators, and other related equipment. As discussed in Section 2.1.9.1, employment of up to approximately 100 individuals would be necessary to complete initial construction activities. Construction activities which would occur during the routine mining operations would require up to 40 individuals. Construction activities related to the overbuilding of the 34.5 kV transmission line are discussed in Section 2.1.9.3.1.

2.1.3. Mining

"Ore" is an economic term used to describe a resource which can be profitably mined and processed. The size and configuration of the proposed pits is defined by the precious metals content, depth of mineralization, metallurgy and other geologic, geotechnical and economic factors.

Based on the results of ongoing exploration and development drilling, three (3) ore zones have been delineated. These would be mined as the proposed West Pit, Singer Pit, and East Pit (see Figure 2-2). The Mineralized Potential Area, which co-joins the proposed pits, delineates the currently known outer boundary of potential mining activity. ~~If economically viable, the Mineralized Potential Area would be mined, thus creating one (1) large pit.~~ The estimated pit dimensions resulting from development of the currently known ore zones are listed in Table 2-2. ~~The final pit floor elevations may be lower if the Mineralized Potential Area can be economically mined.~~

In the waste rock stockpile and leach pad areas, exploratory "condemnation" drilling was conducted on approximately 2,000-foot centers to identify possible open pit-type reserves. Drilling results from the waste rock stockpile and heap areas indicated that no continuity between assays or holes were identified which would indicate the presence of a minable resource at those sites.

Mining of the ore zones would employ conventional open pit mining techniques. The mining sequence would be phased, with the West Pit mined first, followed by mining of the East Pit, followed by mining of the Singer Pit. Mining in the

Mineralized Potential Area, if undertaken, may also occur prior to mining of the East Pit. Figure 2-3 shows the projected final ~~contours~~ configuration of the West Pit following the completion of mining of that pit.

Figure 2-3: Imperial Project Mine and Process Area - Projected West Pit Contours

Table 2-1: Estimated Disturbed and Undisturbed Acres for the Imperial Project

MINE FACILITY COMPONENT		DISTURBED ACRES	UNDISTURBED ACRES
Mine and Process Area			
Pits	West Pit	124	
	East Pit	227	
	Singer Pit	34	
	Mineral Potential Area	68	
	Subtotal:	**453**	
Process Facilities	Pad	329	
	Process Facility Area	21	
	Lime Bin Area and Fresh Water Pond	1	
	Subtotal:	**351**	
Waste Rock Stockpiles	East Waste Rock Stockpile	73	
	West Waste Rock Stockpile~~s (two adjacent stockpiles)~~	~~28~~20	
	South Waste Rock Stockpile	224	
	Subtotal:	**~~325~~317**	
Soil Stockpiles	West Soil Stockpile	3	
	North Soil Stockpiles (two adjacent stockpiles)	21	
	South Soil Stockpile	17	
	Subtotal:	**41**	
Support Facilities	Office/Maintenance/Parking/Power	14	
	Haul and Maintenance Roads	164	
	Drainage Diversions	16	
	Subtotal:	**194**	
Mine and Process Area Subtotals:		~~1,364~~1,356	~~248~~233
Total Mine and Process Area Acreage:		**~~1,612~~1,589**	
Ancillary Area			
County Road Realignment		7	
Powerline, Water Wells and Pipeline Route		29	
Ancillary Area Subtotals:		36	-
Total Ancillary Area Acreage:		**36**	
TOTAL PROJECT AREA DISTURBED AND UNDISTURBED ACREAGE:		**~~1,400~~1,392**	**~~248~~233**
TOTAL PROJECT AREA ACREAGE:		**~~1,648~~1,625**	

Table 2-2: Projected~~-Maximum~~ Surface Dimensions, Depth from Surface, and Pit Floor Elevations of the Open Pits

PIT	PROJECTED ~~MAXIMUM~~ PIT DIMENSIONS			PIT FLOOR ELEVATION (ft AMSL)
	LENGTH (ft)	WIDTH (ft)	DEPTH (ft)	
West Pit	2,700	2,700	760	~~-60~~100
East Pit	4,700	2,700	880	-60
Singer Pit	1,000	2,000	400	460

It is anticipated that waste rock would be placed on waste rock stockpiles adjacent to the pits or, as mining proceeds from one pit to the next, into previously mined-out open pits. As mining progresses, the West Pit would be entirely backfilled. Subsequent backfill would then be placed into other open pits whenever access to additional economic mineralization is not impeded. Figure 2-4 shows the projected final ~~contours~~ configuration of the East Pit and the backfilled West Pit subsequent to the completion of mining and placement of waste rock, and prior to the commencement of final reclamation. If unanticipated circumstances arose which would necessitate a cessation of mining activities, no post-mining placement of waste rock in the pits would be conducted, except as may be necessary to raise the floor of the pit above the level of any predicted pit lake which may be formed from the inflow of ground water.

The overburden thickness above the ore zones ranges from 40 to 350 feet and consists mostly of alluvial gravels (both unconsolidated and cemented) and minor amounts of volcanic rock. Mining of the unconsolidated gravels may not require blasting; however, the cemented gravels are expected to require blasting prior to excavation. Ore and some waste rock are comprised of weakly-altered gneiss. All of this material is expected to require drilling and blasting prior to excavation.

Mobile rotary blast hole drills would drill 6-3/4-inch to 10-inch diameter blast holes spaced on between 16- and 35-foot centers. The rock would be blasted with a conventional ammonium nitrate/fuel oil (ANFO) blasting agent, although an emulsion blasting agent may be used in the event water is found in the drill holes. Blasting would ~~average between~~ generally occur three (3) ~~and~~ to five (5) times per week during daylight hours.

The blasted rock would be loaded, using an electric shovel or diesel front-end loader(s)/shovel(s), into 240-ton, or larger, capacity haul trucks. No crushing of the ore is anticipated, and run-of-mine (ROM) ore would be hauled by the haul trucks

Figure 2-4: Imperial Project Mine and Process Area - Projected Final Contours

directly to the heap leach pad. Waste rock would also be hauled directly to a waste rock stockpile, or hauled to one of the pits to be backfilled (see Section 2.1.5). Haulage ramps in the pit have been designed with a minimum width of 100 feet and a maximum gradient of 10 percent. Minor sections of temporary ramping may be steeper and narrower. Haulage roads outside of the pit areas would be typically up to 100 feet wide, and in some areas would be 150 feet wide to allow for surface drainage areas and separate lanes for support vehicle traffic.

Engineering analysis and Chemgold's experience at Chemgold's Picacho Mine, located in Imperial County approximately 8 miles to the east of the Project mine and process area, indicates that the ultimate pit walls would have overall slope angles of about 50 degrees (1 horizontal to 1.2 vertical (1H:1.2V)). Pit walls would have safety benches at regular vertical intervals to contain minor rock spills. Pit wall slopes may change as actual mining conditions and geotechnical and safety factors warrant.

Piezometer and exploration drill holes drilled in the projected locations of the bottoms of the East Pit and the West Pit have encountered ground water at depths of 88 feet AMSL and 211 feet AMSL, respectively, which is above the anticipated floor of the respective pits. As such, it is possible that ground water would enter either or both of the pits during mining operations. However, tests have indicated that the hydraulic conductivity of the bedrock formation is very low, and total ground water inflow has been estimated at only 1.5 gpm for the West Pit and 0.7 gpm for the East Pit. Should ground water be encountered in the pits during mining operations, it would be utilized in dust control operations, or collected and used in process operations.

Since the West Pit would be backfilled with waste rock mined from the East Pit, this would prevent the formation of a pit lake in the filled West Pit. Calculations for the East Pit indicate that the estimated annual evaporation rate is approximately 170 times the annual estimated ground water and precipitation inflow rates, indicating that the formation of a pit lake in the bottom of the East Pit after the cessation of mining activities is not probable. However, Chemgold would conduct an assessment at the end of mining to determine if ground water encountered in the East Pit may enter the pit in sufficient ~~quantity~~ quantities in spite of evaporation to create a pit lake. If this assessment indicates that the formation of a pit lake is sufficiently likely, Chemgold would then place sufficient backfill into the open East Pit to raise the floor of the pit to a level higher than the level of any pit lake which may be eventually predicted to form from the inflow of ground water.

2.1.4. Geochemical Characteristics of Mined Materials

Some types of waste rock, leached ore, or fresh ore can acidify contacting water when exposed to the atmosphere and ground or meteoric water. This ability is characterized as a rock's "acid potential." Generally, rock with a high acid potential contains disseminated sulfide minerals which can react with water and atmospheric oxygen to produce sulfuric acid. The generated acid may then leach potentially toxic metals and other constituents from the waste materials. Other waste rock, leached ore, or fresh ore may be acid-neutralizing under the same conditions. This is a rock's "neutralization potential." Waste rock materials with low acid potential and high neutralizing potential are generally environmentally benign.

Two A waste rock characterization study was conducted

Geochemical ~~rock~~ characterization ~~analyses~~ study were conducted on waste rock and ~~leached~~ ore samples from the Project mine and process area to determine whether the ore and waste rock materials would have the potential to be acid generating, and determine the chemical characteristics of the potential leachate ~~generated~~ from these materials under various conditions (EMA, ~~1995~~; see Appendix ~~B~~ C-1 and C-2). The sampling and analyses procedures used to characterize the waste generated from the Project, as described in the following sections, were based on procedures generally accepted by the California Regional Water Quality Control Board, Colorado River Basin Region (CRWQCB) for characterizing mine waste material. spell out

2.1.4.1. ~~Acid Neutralization Potential~~ Static Test Analyses

As part of the Acid Neutralization Potential (ANP) analysis, the total sulfur content of each sample was determined to evaluate its acid potential (AP). The neutralization potential (NP) of each sample was also determined. The ratio of NP:AP is the sample's acid neutralization potential (ANP). Based on these analyses, the potential for the Project waste rock and spent ore material to be acid generating was found to be low to very low. These findings are consistent with observations made by Chemgold geologists that the ore and waste rocks are devoid of sulfide minerals.

2.1.4.2. Geochemical Characteristics

Metal analyses, using total metal and acidic rain water extraction methodologies (the latter using the U.S. Environmental Protection Agency (USEPA) Synthetic Precipitation Leaching Procedure (SPLP) (Method 1312)), were conducted on samples of waste rock and ore material. The SPLP is designed to simulate the concentrations of metals and other compounds which could be leached from waste materials exposed to acidic rainfall. Ore samples were first subjected to leaching by dilute cyanide solution to remove precious metals, then neutralized, to be representative of the

leached ore material which would remain on the heaps following completion of Project activities.

None of the total extracted metal concentrations from the samples exceeded the State of California Total Threshold Concentration Limits (TTLCs) for characteristically toxic hazardous waste for any constituents tested, and most metal concentrations were an order of magnitude or more below the respective TTLC values. Metal concentrations detected in the solution extracted from samples using the SPLP method were all consistently very low.

2.1.5. Waste Rock Stockpiles

~~Four (4)~~ Three (3) waste rock stockpiles are proposed: ~~two (2)~~ one (1) located to the north of the West Pit (the "west" waste rock stockpile); ~~and~~ one (1) to the south of the West Pit (the "south" waste rock stockpile); and one (1) located north of the East Pit (the "east" waste rock stockpile). The waste rock stockpile locations were selected to minimize disturbed acreage, and minimize stockpile height and haulage distance. Up to 450 million tons of waste rock would be mined and placed onto the waste rock stockpiles. As described in Section 2.1.3, most of the waste rock consists of cemented and uncemented alluvial gravels, although some bedrock (Jurassic Age gneiss and minor amounts of Tertiary Age volcanic rock) would also comprise waste rock. No segregation of waste material is planned for the waste rock stockpiles.

The ~~two (2)~~ "west" waste rock stockpiles, located north of the West Pit, would likely be constructed first, followed by construction of the "south" waste rock stockpile, located south of the West Pit. The "east" waste rock stockpile, located north of the East Pit, would likely be constructed last. These waste rock stockpiles would be constructed in successive 50-foot to 100-foot lifts, to a maximum height of 400 feet, and would be engineered to have overall 2 horizontal to 1 vertical (2H:1V) final slopes. The waste rock stockpiles would be developed by end-dumping from the haul trucks, with the active face of each lift lying at the angle of repose of the waste rock (typically 1.5H:1V).

As mining proceeds from the West Pit to the East Pit, waste rock from the East Pit would be placed into the previously mined-out West Pit. Subsequent waste rock would be placed into an open pit whenever access to additional economic mineralized areas is not impeded.

2.1.6. Soil Stockpiles

Soil would be salvaged from the surface of disturbed wash areas within the Project mine and process area for use during reclamation (see Section 2.1.11.3) and would be stockpiled at any one of four (4) proposed sites: one (1) stockpile located to the northeast of the leach pad; two (2) stockpiles located east of the Singer Pit; and one (1) stockpile located to the southwest of the West Pit (see Figure 2-2). In addition, the tops of the ~~northern~~ "west" and "east" waste rock stockpiles would be available for the storage of stockpiled soil. The soil stockpiles would be clearly identified with signs to assure that the material was not misidentified as waste rock material. Erosion control methods would be used to re-route any storm flows around the stockpiles to natural drainages at velocities that would minimize erosion (see Section 2.1.9.7).

2.1.7. Temporary Storage Areas and Construction Sites

The Mineralized Potential Area, and the top surfaces of waste rock stockpiles, would be temporarily utilized for equipment storage, assembly and erection; and for the stockpiling of construction materials and aggregates. These stockpiled materials and aggregates would be hauled from the temporary storage areas to be used by mobile crushing and screening systems which would be brought on the site over the life of the Project to construct the sequential phases of the leach pad facility (see Section 2.1.8).

2.1.8. Ore Processing Facilities

Ore would be processed using conventional heap leach methods. This methodology is currently utilized by Chemgold at its Picacho Mine, located eight (8) miles east of the Project; by other companies at the two (2) mines in the vicinity; and at numerous other mines throughout the western United States. The process involves stacking the ore on engineered, synthetically-lined, impervious pads. The surface of the ore heaps is then wetted with an alkaline solution containing low concentrations of cyanide. This solution percolates through the ore, producing a soluble, precious metal-cyanide complex, known as the "pregnant" solution. The pregnant solution drains through the heap to the pad liner, then flows within a pipe drainage system to the pregnant solution storage pond. The gold/silver-bearing pregnant solution is then pumped from the pregnant pond to the processing facility, where the precious metals are extracted from the solution by way of a carbon adsorption process. The resultant "barren" solution, from which the gold/silver has been removed, then flows to the barren solution storage pond before being pumped back to the heap to begin the cycle again.

The carbon from the adsorption process is stripped of its gold/silver by a stripping solution, from which the gold/silver is then electroplated onto steel wool or stainless steel cathodes. The gold/silver-bearing cathode material is smelted in a furnace with a flux to produce gold/silver "doré." The doré is subsequently refined offsite.

Development of the proposed ore processing facilities would include the construction of a 329-acre heap leach pad, ~~and~~ a lime bin area, and a ~~/~~fresh water pond, the latter two (2) together comprising a total of approximately one (1) additional acre. Associated processing buildings, process solution ponds, and a storm water retention pond would comprise an additional 21 acres (see Figure 2-2 and Table 2-1). The heap leach pad, as well as the collection channels and process ponds, would be designed as lined, zero-discharge facilities with leak detection systems, in conformance with California Code of Regulations (CCR), Title 23, Chapter 15 regulations and the CRWQCB Waste Discharge Requirements (see Section 2.1.8.1, Section 2.1.8.2 and Section 2.1.8.3).

2.1.8.1. Heap Leach Facility

The heap leach facility pad would be designed to hold 150 million tons of ore. The run-of-mine ore would be stacked at an approximate rate of 12 million tons per year over the life of the Project. The leach pad liner facility would be constructed in three (3) to four (4) ~~to five (5)~~ phases as space is required for new ore. A portable crusher and screen plant would be utilized to develop the aggregates for the liner system, which would come from the waste rock mined during normal mining activities. The construction materials would be temporarily stockpiled and then hauled to the liner system for installation. It is anticipated that liner system construction activities would occur once every two (2) to four (4) years.

As part of the leach pad construction, the site to be constructed would be graded to ensure solution drainage from the leach pad to the solution ponds. In addition, the heap benches and berms would be constructed to provide for 100 percent containment of the precipitation from the 1 hour probable maximum precipitation (PMP) design storm event (4.65 inches, which is the average of the 1 hour PMP from El Centro and Yuma) in order to minimize runoff from the heap piles and maximize infiltration of storm water into the heap piles. A service road and containment berm would be constructed around the perimeter of the pad to assure that process solution and rain which falls onto the heap drains to the pregnant solution pond. Interceptor ditches would be constructed to divert upstream surface runoff around the heap leach facilities. A six (6)-foot high, metal, chain-link fence, topped with one (1) foot of barbed wire ("process fence"), would surround the entire leach pad and process area.

The heap leach pad liner would be designed to serve as an engineered alternative to the prescriptive standard for a Group B mining waste, waste pile, as contained in Title 23, Chapter 15 of the CCR, and may be approved, or modified, by the CRWQCB in the Waste Discharge Requirements for the Project. Phase 1 of leach pad construction would consist of a composite of 40-mil PVC primary and ~~30~~ 20-mil PVC secondary geomembrane liners placed directly on four (4) inches of compacted, fine-grained, bedding material. If low permeability clay materials are available, Phases 2 through ~~5~~ 4 of leach pad construction would consist of a composite of 40-mil PVC geomembrane liner overlying twelve (12) inches of compacted, low-permeability clay materials with a maximum permeability of 1 x 10^{-6} cm/sec. If low permeability clay materials are not available, ~~these~~ Phases 2 through ~~5~~ 4 of the leach pad would be constructed similar to Phase 1.

An engineered drain pipe network would be placed on top of the liner system for all ~~five (5)~~ four (4) phases of leach pad construction. Following the placement of one (1) layer of twelve-ounce geofabric above the 40-mil PVC geomembrane liner, a 24-inch layer of minus 1¼-inch screened/crushed, free-draining gravel would be placed on top of the liner system to protect the liner, facilitate the collection and removal of leach solution, and minimize the hydraulic head on the synthetic liner.

A containment berm, with a minimum height of six (6) feet above the outside natural ground elevation, would be constructed around the perimeter of the ore heap. The ore heap would be typically set back eighteen (18) feet from the inside crest of the berm. The leach pad system would be designed such that pregnant solution would drain internally to the central pipe network and into the pregnant solution pond. No solution ditches would be present. A containment berm for the 24-inch solution pipes would be installed along the downhill toe of the leach pad.

It is anticipated that the first lift of run-of-mine ore would be loaded onto the heap leach pad directly over an intervening layer of free-draining gravel. The ore would be loaded onto the pad, without prior crushing, by end-dumping from the haul trucks. Approximately two (2) pounds of lime per ton of ore would be placed onto the trucks at the lime bin location. The ore would be spread and scarified to produce a heap pile with relatively uniform thickness and percolation characteristics.

The proposed heap leach facilities would be constructed in progressive lifts to a maximum height of 300 feet above existing grade. Overall exterior slopes would be 2H:1V, designed for operational stability, decommissioning, and final

reclamation (see Section 2.1.11.2.5 ~~?~~). Barren solution would be applied to the ore using conventional drip emitter irrigation technology. Sprinklers would be used during decommissioning and rinsing of the heaps, and possibly after major storm events to facilitate evaporation of excess water.

Monitoring of the heap for ponding of the cyanide solution and equipment malfunction would be conducted once per shift, seven (7) days per week. Any discovered mechanical malfunction in the emitters, pipelines or other equipment would be repaired immediately. Should any ponding of the cyanide solution on the heap leach be found, the area would be repaired by reducing the number of emitters in the area (thereby reducing solution flow), or by removal of the emitters, scarification of the heap surface under the emitters, and reinstallation of the emitters.

2.1.8.2. Barren, Pregnant and Storm Water Ponds

The barren and pregnant process solution ponds and storm water overflow pond would be constructed immediately down-slope of the leach pad. Leach solution and rain which falls on the heap would drain by gravity through the heap to the liner, then directly to the process ponds. The combined process and overflow ponds have been designed to hold the working volume of solution, and the rainfall run-off from the heap following a maximum probable one-hour storm event occurring simultaneously with a 24-hour power outage, while maintaining a two-foot freeboard. ~~The capacity of the pregnant and barren solution ponds would each be approximately 7.1 million gallons (with a two-foot residual freeboard), for a combined storage capacity of about 14.2 million gallons. The overflow storm water pond would have a capacity of approximately 25.8 million gallons (also with a two-foot residual freeboard), and can be expanded within the projected area of disturbance, if determined to be necessary, to accommodate higher storm flows or increased operational flows.~~ The capacity of the pregnant and barren solution ponds, approximately 10.2 million gallons each, will together be sufficient to store the stormwater runoff (including a two (2)-foot freeboard) for Phase 1 of the leach pad without construction of the overflow pond. The approximately 22.4 million gallon stormwater overflow pond will be constructed during the construction of Phase 2 of the leach pad, and will provide sufficient additional stormwater capacity (including a two (2)-foot freeboard) for both Phase 2 and Phase 3 of the heap leach pad. If Phase 4 of the heap leach pad is constructed, the stormwater pond would be expanded to meet the stormwater runoff requirements for the additional pad space.

All pond liner systems ~~would~~ are currently proposed to consist of an inner ~~60-mil~~ 20-mil thick ~~high density polyethylene (HDPE)~~ polyvinyl chloride (PVC)

liner and an outer ~~60-mil~~ 45-mil thick ~~HDPE~~ (OGR) liner, separated by ~~geofabric~~ geonet on the pond sides and a ~~geonet~~ geotextile layer ~~situated directly below a layer of geofabric~~ on the pond bottom, as may be approved, or modified, by the CRWQCB in the Waste Discharge Requirements which will be issued for the Project. The geonet/geotextile is part of the leachate collection and recovery system (LCRS), which also includes a sump, consisting of select drain fill, placed at the lowest corner of each pond between the geomembrane liners. A leak detection well, consisting of 8-inch diameter, Schedule 80 PVC pipe, would be placed in the sump and "daylighted" at the top of the pond for monitoring any fluid which reached the sump. The well pipe would be screened in the sump material.

The pregnant and barren solution ponds would be constructed with solution pond covers, consisting of small-mesh nets. A solid 40-mil HDPE/polypropylene (PPE) synthetic material or floating HDPE balls may also be used, if determined necessary. Discharge of leach solution and precipitation from the leach pad to the ponds would occur in pipelines within the netted area of the ponds.

2.1.8.3. Vadose Zone and Ground Water Monitoring

A vadose (unsaturated ground water) zone monitoring system would be installed to detect potential leaks in the pad lining system. This vadose zone monitoring system is currently proposed to consist of liquid collection devices installed beneath the liner system. The actual vadose monitoring system installed, and the coverage required, must be approved, and may be modified, by the CRWQCB in the Waste Discharge Requirements for the Project.

A minimum of two (2) ground water monitoring wells would be drilled and completed in the uppermost water bearing zone beneath the pad to intercept the upper 10 feet of ground water. The actual well locations and monitoring depths would be based on: subsurface water levels; the general ground water gradient as it currently exists; future ground water level measurements; and the requirements of the CRWQCB Waste Discharge Requirements when issued. A ground water monitoring program for these wells would be approved by the CRWQCB and implemented by Chemgold to sample and test the ground water passing beneath the leach pad and ponds to detect any leakage from the facilities into the shallow ground water. ~~One~~ Two (2) monitoring wells, one (1) located at the upgradient boundary and one (1) located at the downgradient boundary of the Project mine and process area near the heap, have ~~, has~~ already been installed by Chemgold and quarterly samples of the shallow ground water are being taken. ~~This~~ Either or both of these wells may be accepted by the CRWQCB as one or both of the two (2) or more required monitoring wells.

2.1.9. Support Facilities

Support facilities located within the Project mine and process area would include: office buildings with approximately 7,000 square feet of floor space; a maintenance shop of approximately 20,000 square feet on a reinforced concrete slab; telephone facilities, including a roof-mounted microwave communications antenna; explosives magazines; an ammonium nitrate storage facility; a lime storage facility; chemical storage areas; diesel fuel storage areas; water storage facilities; an emergency electrical power generator; a hazardous waste storage area; equipment wash facilities; a laboratory; roads; and surface flow and erosion control structures. Project support facilities located within the Project ancillary area would include: water supply wells and connecting pipeline; an electrical metering station and electrical powerlines; and the realignments of portions of Indian Pass Road. Project support facilities located outside of the Project area would include a "rebuilt" electrical transmission line.

2.1.9.1. Manpower

Approximately 100 workers may be required to construct the Project facilities; however, only a percentage of these workers would be employed at the Project site at any given time. Contractor personnel would be hired to: construct the leach pad liner systems, ponds, process plant and related facilities; perform civil construction, concrete work, liner installation and quality control; install electrical utilities and communication systems; and complete other miscellaneous tasks. Chemgold employees, possibly from the existing Picacho Mine, would be utilized for: construction management; technical services; pre-stripping the orebodies; earth moving; and facility preparation.

Transitioning from the construction phase to the operating phase would increase the number of workers to as many as 150 full-time employees. Mining and processing operations would be conducted 24 hours per day, 365 days a year. The work force would be predominantly from Imperial County, California and Yuma County, Arizona. It is anticipated that as many as 55 of the current Chemgold Picacho Mine employees would transfer to the Project after the completion of mining at the Picacho Mine. Employment levels for the Project would remain relatively constant for the full Project mine life of up to twenty (20) years. Employees would be encouraged to carpool to the mine site.

2.1.9.2. Water Supply and Distribution System

Development of a water supply system would be required to supply water to the Project sufficient to operate the heap leach and related facilities, and provide water for dust control. Peak water consumption of approximately 1,000 gpm,

averaging approximately 1,200 afy, would be created by the evaporative loss and capillary retention of water in the heaps (approximately 75 percent of the water loss), and by water used for dust suppression, office/domestic use, and construction and reclamation (approximately 25 percent of the water loss). All water used in the processing of the ore not evaporated would be recycled back onto the leach pad.

Chemgold is proposing to develop a ground water well field to provide the Project water requirements. Production of the water would require drilling and completion of up to four (4) water wells within the Project ancillary area (see Figure 2-1). The initial well has been drilled as a ground water exploration well near the intersection of the existing electric transmission line and Indian Pass Road, approximately four (4) miles from the southern boundary of the Project mine and process area. The final number of wells and the specific location of each of the additional wells will be dependent on the results of the testing of each of the wells. However, all wells would be drilled within the Project ancillary area, adjacent to Indian Pass Road, within 1.5 miles of the existing well. The water would be pumped to the surface from a depth of 800 to 1,000 feet below ground surface (bgs) by electrical pumps. The water would be conveyed by buried pipeline from the wells to above-ground water storage and distribution tanks, or to the fresh water storage pond, constructed within the Project mine and process area. Both the buried pipeline, and any required electric power distribution line needed to power each of the well pumps, would be constructed adjacent to the access road to each well.

2.1.9.3. Electric Power Supply and Utilities

2.1.9.3.1. Electrical Power

Peak electrical power requirements for the Project would be approximately 8 MW, which would be supplied ~~by a local~~ from the utility power system. To deliver this power to the Project, an existing 34.5 kV transmission line owned by the local electrical utility, the Imperial Irrigation District (IID), would be "overbuilt" for approximately sixteen (16) miles, from immediately south of Interstate 8 just east of Sidewinder Road to Indian Pass Road near Ogilby Road, with a new 92 kV transmission line, to also be owned by the IID (see Figure 2-5). This new 92 kV/34.5 kV transmission line would be connected to the existing IID 92 kV "C-Line," located immediately south of Interstate 8. At the point where the existing 34.5 kV transmission line crosses Indian Pass Road (approximately 4.5 miles southwest of the Project mine and process area), a new electrical metering station, to be owned by the Project, would be constructed (see Figure 2-5). From the metering station, a new 92 kV

Figure 2-5: Existing and Proposed Transmission Lines

transmission line, also owned by the Project, would be built adjacent to the south side of Indian Pass Road to a mine substation located within the Project mine and process area (see Figure 2-5). The new 92 kV/7.2 kV substation would be constructed to transform the electrical power to the 7.2 kV voltage used by the Project. A 7.2 kV distribution line would be "underbuilt" on the same poles as the new 92 kV transmission line running adjacent to Indian Pass Road to provide power as necessary to the ground water well pumps located adjacent to Indian Pass Road in the Project ancillary area.

Emergency power requirements for essential loads and services for the Project during periods of utility service interruption would be provided by a ≥500 kW, diesel-powered, electric generator located near the processing facility in the Project mine and process area.

The metering station would be built within a fenced area approximately 25 feet by 50 feet located southeast of the intersection of the existing 34.5 kV transmission line and Indian Pass Road. The mine substation would be enclosed within a similarly sized fenced area among the Project facilities located near the northwest corner of the heap leach pad.

"Overbuilding" the existing 34.5 kV transmission line would consists of: (1) tilting the existing wooden poles to the side to move the electrical conductors out of the current transmission line alignment; (2) installing new, taller, wooden poles ~~immediately adjacent to the existing wooden poles~~ in the same transmission line alignment; (3) installing the new 92 kV conductors near the top of the new poles; (4) moving the existing 34.5 kV conductors from the existing poles to below the 92 kV conductors on the new poles; and (5) then removing the existing poles.

The 92 kV/34.5 kV transmission line would be constructed within the 20-foot wide right-of-way granted by the BLM and the easements obtained from the private landowners near Interstate 8 for the existing 34.5 kV transmission line. Construction access would be from the existing transmission line access road, which roughly parallels the entire length of the transmission line. To tilt and remove the existing poles, the short trails from the access road to each existing pole and the areas around each existing pole which were disturbed when the transmission line was originally installed in the 1960's will be redisturbed. However, spacing of the new poles may be reduced to approximately 300 feet from the existing pole spacing of approximately 400 feet, which would require the disturbance of short trails from the existing access road to each new pole, and disturbance of an area around each new pole, during the construction process. Additional surface

disturbance will also occur when the existing and new conductors are "pulled" from cable pulling stations, and from equipment laydown areas to be established at each end of the transmission line. ~~The existing access road and previously disturbed pole trails and cable pulling stations would be used to install the new poles and string the new conductors. Thus, no new surface disturbance is anticipated during construction or operation of the overbuilt transmission line, although construction would redisturb those areas which had been previously disturbed by the original construction of the transmission line in the 1960's. The 92 kV transmission line would be constructed within the 20± foot wide right-of-way granted for the existing 34.5 kV transmission line.~~

Assuming an average of 50 feet of 10-foot wide pole trail and a 20-foot by 50-foot area of disturbance for each of the approximately 210 existing poles, a total of approximately seven (7) acres of previously disturbed land would be redisturbed during the "overbuilding" of the transmission line. A total of up to ten (10) additional acres would be disturbed for installation of approximately 280 new poles if new poles were spaced at 300-foot intervals and none were installed in the same locations as existing poles. An approximately 100-foot square area would be disturbed for each of the estimated nine (9) cable pulling stations (about one (1) for every two (2) miles of transmission line), which would result in disturbance to approximately two (2) acres. Laydown areas would disturb approximately an additional two (2) acres. Total disturbance during construction of the "overbuilt" 92 kV/34.5 kV transmission line would be approximately 21 acres.

2.1.9.3.2. Telephone Service

Telephone service would be provided to the offices and maintenance shop by a microwave system located within the Project mine and process area. Field communications would be provided by an FM mine communication system.

2.1.9.4. Chemical Use and Storage

Numerous chemicals would typically be stored at, and used by, the Project (see Appendix ~~C~~ A for a complete list of chemicals stored and used). These can be generally categorized as heap leach processing chemicals; mine chemicals/explosives; maintenance facility/power generation chemicals; and laboratory chemicals. Miscellaneous laboratory chemicals would be maintained in small quantities only and kept in containers in the on-site laboratory. Most of the bulk chemicals would be stored in closed, weather-proof containers in secured,

open-air storage areas. All chemicals would be stored in conformance with local, state and federal regulations and company safety policies.

Heap Leach Processing Chemicals:

The principal heap leach processing chemical, sodium cyanide, may be received either dry or as a liquid. Liquid cyanide would be off-loaded from the manufacturer's specially-designed trucks into one (1) of two (2)~~,~~ 20,000-gallon storage tanks at a concentration of about 30 percent cyanide and a pH of about 13. Dry cyanide would be shipped~~,~~ and received ~~and stored~~ in the manufacturer's dry bulk trucks ~~3,000 pound net capacity flow bins~~. Solid sodium cyanide would be put into solution directly from the ~~flow bins~~ flow trucks and also stored at a concentration of about 30 percent cyanide and a pH of about 13 in one (1) of the two (2) storage tanks. All cyanide would be stored within the lined Project process area, surrounded by a security fence. Sodium cyanide solution would be metered directly into the barren solution in the pipes leaving the barren solution pond for application to the heap. The cyanide concentration of the barren solution applied to the heap would be maintained at the desired 200 to 350 ppm for effective leaching of the ore. Similar cyanide handling practices are currently utilized at Chemgold's Picacho Mine, and are standard in the precious metal processing industry. Annual sodium cyanide usage is anticipated to be approximately 1,750 tons.

Other heap leach processing chemicals (including sodium hydroxide (for cyanide solution pH control), hydrochloric acid (for carbon cleansing), and carbon (for removing precious metals from the pregnant solution) would be stored in secured, hazardous materials storage yards near the process facility. Acids would never be stored near cyanide. Calcium oxide (lime), which would likely be added directly to each haul truck prior to loading the ore on the heap leach pad, would be stored in silos on the north end of the heap leach loading ramp. Anti-scalants (principally polymaleic acid) would be stored adjacent to the process ponds. Calcium hypochlorite [$Ca(ClO)_2 \bullet 4H_2O$] would be kept on site to neutralize any small spills of liquid NaCN. Annual usage of these chemicals is estimated at 150 tons for sodium hydroxide; 212 tons for hydrochloric acid; 130 tons for carbon; 16,500 tons for lime; and 150 tons for polymaleic acid.

Mine Chemicals/Explosives:

The mine chemicals/blasting agents and associated explosives which are necessary for mining operations would be stored in magazines in compliance with U.S. Bureau of Alcohol, Tobacco and Firearms (ATF), and Mine Safety and Health Administration (MSHA), safety standards. The ammonium nitrate used in

blasting would be stored in bulk in silos. Annual consumption of the bulk ammonium nitrate would be approximately 7,500 tons.

Maintenance Facility/Power Generation Chemicals:

The maintenance facility/power generation chemicals stored and used in the greatest quantities are diesel fuel, unleaded gasoline, and motor oil, all of which are stored in above-ground tanks located within a containment structure located next to the maintenance shop. Annual consumption of gasoline is estimated at approximately 40,000 gallons, and annual lubricant consumption is estimated at 31,000 gallons. Annual diesel fuel consumption for blasting and fueling on-site equipment and use in the emergency generator is estimated at 4 million gallons.

2.1.9.5. Waste Disposal

Septic treatment systems with leach drain fields would be installed near the office and shop facility, adjacent to the processing and laboratory facilities, and adjacent to the lime storage facility. Chemgold would contract with local disposal service companies for the pumping of septic tanks and the removal of other (non-mining) waste from the Project area for disposal in an approved landfill. Regulated wastes, such as used antifreeze, spent solvents, batteries, and used oils and oil filters, would be transported offsite by a company authorized to recycle these regulated wastes. These wastes would be recycled or disposed of in conformance with all applicable local, state and federal laws and regulations, and in a manner approved by the responsible regulatory agencies.

Major maintenance of equipment would be conducted within the concrete-paved and bermed areas of the maintenance yard to the extent possible to minimize accidental discharges of waste lubricants and other materials to the ground. All mining equipment would be equipped with the "EVAC" servicing system, which allows quick, "leak-free" lubricant servicing from mobile and stationary servicing equipment.

2.1.9.6. Roads

Haul roads constructed to haul mined material within the Project mine and process area would typically be approximately 100 feet wide, although in some areas would be as much as 150 feet wide to allow for surface drainage areas and separate lanes for support vehicle traffic. Service or maintenance roads within the Project mine and process area would be approximately 30 feet wide. A service road would be constructed inside the perimeter fence around the perimeter of the Project mine and process area to provide access for maintenance and security; in

some locations, this perimeter road would be coincident with constructed haul roads.

Access to the Project would be from Ogilby Road, a county-maintained two-lane paved road, via Indian Pass Road, a county-maintained gravel road (see Figure 2-6). Project traffic on Ogilby and Indian Pass Roads is estimated at approximately 47 lightweight vehicle round trips per day during normal operations. Heavy truck traffic is estimated at approximately 3.5 round trips per day.

Small numbers of light vehicles may also occasionally access the Project area from Chemgold's Picacho Mine, located eight (8) miles to the east of the Project area, via BLM Route A278, Hyduke Road. Neither Hyduke Road nor the BLM open routes of travel in the vicinity of the Project mine and process area would be used for heavy truck or equipment traffic. Occasional use of Hyduke Road by lightweight vehicles would continue until final closure and reclamation of the Picacho Mine.

The approximately 6,000-foot section of Indian Pass Road located within the Project mine and process area would be relocated prior to mining the West Pit, as the pit would occupy the road's current location (see Figure 2-4). Figure 2-2 shows the proposed relocation of Indian Pass Road, which would shift the road approximately 1,000 feet to the west of its current location to allow continued public access to areas north of the Project. Construction of the realigned section of Indian Pass Road would begin immediately following receipt of approvals to proceed with the Project and would require approximately two (2) months to complete. Indian Pass Road would be maintained open to the public during construction of the relocated portion.

After completion of mining at the West Pit, waste rock stripped from the sequential mining of the East Pit would be placed in the mined-out West Pit. Should sufficient waste rock be subsequently produced to allow for backfilling of the mined-out West Pit, Indian Pass Road would be returned to a location east of and approximately parallel to the diverted west drainage channel ~~its current location~~, and the area disturbed by the relocated segment of Indian Pass Road ~~realigned road segment~~ would be regraded and reclaimed (see Figure 2-4).

The intersection of Indian Pass Road and Ogilby Road would also be realigned to have Indian Pass Road meet Ogilby Road at a right angle, rather than the acute angle which the intersection now has. This would be accomplished by constructing a new intersection approximately 330 feet south of the current intersection of Ogilby Road and Indian Pass Road, and connecting the current

Figure 2-6: Access Roads and Open Routes of Travel

alignment of Indian Pass Road with this new intersection through an approximately 60° turn with a radius of approximately 105 feet. The abandoned section of Indian Pass Road would be regraded and reclaimed (see Section 2.1.11.2).

If acceptable to Imperial County, Chemgold plans to post signs on Indian Pass Road at the intersection with Ogilby Road warning drivers that the maintained road ends in 3.5 miles (prior to the Project mine and process area). Signs would also be posted at the two (2) wash crossings along the relocated portion of Indian Pass Road warning drivers not to cross the wash when flooded. Chemgold would undertake emergency repairs or maintenance, as may be necessary and authorized by Imperial County, if Indian Pass Road is damaged by flooding where it crosses existing ephemeral stream channels. Water and/or an environmentally acceptable chemical dust inhibitor such as sodium lignosulfonate (a non-toxic non-hazardous, co-product of cellulose produced from trees), would be applied to Indian Pass Road from its intersection with Ogilby Road to the boundary of the Project mine and process area. Chemgold plans no other alterations to Indian Pass Road to accommodate mine-related traffic.

As part of Chemgold's operations, water sprays and/or chemical treatments would be used to minimize the generation of dust from disturbed surfaces within the Project mine and process area. Water, and/or an environmentally acceptable chemical dust inhibitor, would be applied to the haulage and other roads in sufficient quantities to minimize significant dust emissions. Water would generally be applied on those roads used only temporarily, while the chemical dust inhibitor would be periodically applied to the more ~~well-~~ heavily traveled areas.

2.1.9.7. Surface Flow Diversions

All surface drainages in the area are ephemeral, with flows occurring only during, and immediately following, major precipitation events. Several ephemeral drainages must be either temporarily or permanently diverted around the facilities located within the Project mine and process area. Each of the diversion channels has been designed to safely convey all runoff flows from the 100-year, 24-hour precipitation event, and to direct water back into the same major drainage system from which it was diverted (see Figure 2-7).

The largest diversion ~~temporarily~~ permanently routes the westernmost Project mine and process area wash around the West Pit. This diversion channel would be built to approximate the original drainage system in both gradient and channel geometry (see Figure 2-8). During the period that the West Pit is open, this ~~This~~

Figure 2-7: Diversions of Washes Within the Project Mine and Process Area

Figure 2-8: Cross-Section of West Wash Diversion Channel

~~temporary~~ diversion channel may be temporarily lined with high density plastic or clay protected by rip-rap to prevent subsurface flows into the open pit. Additionally, any ~~Any~~ areas which might be especially susceptible to erosion from ~~resultant~~ surface flows are to be bermed and/or rip-rapped to prevent erosion and potential damage during the period when the West Pit is open ~~temporary period of diversion (see Figure 2-8)~~. Once the West Pit has been backfilled (see Section 2.1.3), ~~a new channel would be constructed in approximately the same location of the original wash and the wash permanently returned to this channel (see Figure 2-4)~~ any rip rap or temporary plastic liners installed in the diversion channel ~~would be~~ removed and the channel regraded. ~~This permanent channel would be built to approximate the original drainage system, and~~ Once the channel has been completed without liners or rip rap, the channel slopes and banks would be selectively planted with young ironwood and palo verde trees or seedlings to begin to reestablish microphyll woodland habitat similar to that removed by excavation of the original stream channel (see Section 2.1.11.3).

may

Three (3) smaller diversion channels would also be constructed to divert storm waters from existing washes around Project facilities (see Figure 2-7). The easternmost diversion channel would be constructed to permanently divert water around the eastern edge of the East Pit and the "east" ~~north~~ waste rock stockpile. The two (2) other diversion channels, which divert the upstream portions of two (2) stems of the central wash around the Singer Pit and within the Mineralized Potential Area, may be relocated and constructed one (1) or more times during the life of mining operations to provide for mining and backfilling of sequential open-pit phases before being permanently constructed. However, in each case, all diversion channels would channel surface flows into other existing nearby drainages which flow back into the same major wash system within the Project mine and process area and would be built to approximate the original drainage system in both gradient and channel geometry.

~~Energy dissipators would be constructed at the end of the channels as necessary to minimize the potential of erosion from the diverted run-off.~~ Temporary diversion channels may be lined and/or rip-rapped to minimize the potential for subsurface leakage into the adjacent open pits. Permanent diversion channels would not be lined or rip-rapped, and permanent channel slopes and banks would be selectively planted with young ironwood and palo verde trees or seedlings to begin to reestablish microphyll woodland habitat (see Section 2.1.11.3).

2.1.9.8. Fences

Prior to the initiation of operations, fencing would be installed around Project facilities to protect the public and wildlife. A 3-strand, 4-foot high, smooth-wire fence would be erected along the entire Project mine and process area boundary, and the southern portion of the central drainage, except as noted below. Along the entire western boundary of ~~in the northwest corner of~~ the Project mine and process area, generally along the boundary adjacent to Indian Pass Road, a 6-foot high chain link fence would be constructed ~~where the fence would be located on the south side of the Indian Pass Road realignment~~ (see Figure 2-2). In addition, those portions of the Project mine and process area boundary coincident with the ore leach pad or process facilities would be fenced with six (6)-foot high, metal, chain-link fencing topped with one (1) foot of barbed wire (see Figure 2-2). In areas where the fence crosses an ephemeral stream channel, the fence would be designed to minimize damage during storm events. These sections of fence would be inspected immediately following a flow event and appropriate repairs undertaken in the event that the fence is damaged to prevent public or wildlife access to the Project mine and process area.

Tortoise-exclusion fencing would be installed coincident with the ~~smooth-wire~~ entire perimeter fence. The tortoise-exclusion fence would consist of 1.5 feet of 0.5-inch mesh hardware cloth above the ground surface. An additional one (1) foot of the mesh would either be buried below ground level, or bent at a right angle towards the outside of the fence and covered with gravel and rocks to prevent animals from burrowing under the fence. The uppermost portion of the hardware cloth would extend not more than two (2) inches above the lowermost wire strand. T-posts, or other suitable anchoring posts, would be placed at appropriate intervals (usually 10- to 16-foot spacing).

The entire ore leach pad~~,~~ and process facilities, and the fresh water pond, would be fenced with 6-foot high, metal, chain-link fencing topped with one (1) foot of barbed wire (see Figure 2-2).

Signs would be posted on the perimeter fence at any locations which could pose a threat to public safety, as required by regulation. Fencing would be maintained until the completion of reclamation activities or until the fence is no longer necessary.

2.1.10. Exploration

Continuing exploration activities are planned for the Project area. These exploration activities may include geophysical surveying, geochemical sampling, mapping, drilling and bulk sampling. The exploration drilling would occur only in the Project mine and process area, and be concentrated within and adjacent to the proposed open-pit areas~~,~~ and in the Mineralized Potential Area. Any exploration proposed outside of the Project mine and process area would be conducted under a additional Plan of Operation and Reclamation Plan.

Exploration drill roads and pads would be constructed in a manner that allows the equipment and personnel to access the exploration target areas without unnecessary soil and vegetation disturbance. Existing roads would be used if they provided the needed access. Exploration holes would be drilled using either reverse-circulation or core-drilling methods. Large diameter holes would be drilled for metallurgical samples. The drilling equipment would be serviced by a water truck/pipe truck/crane truck.

Water requirements for exploration activities would be supplied by Chemgold's proposed water supply system. Existing access roads and trails would be used to the greatest extent possible to minimize additional surface disturbance. All exploration drill holes would be plugged in accordance with applicable state law.

2.1.11. Proposed Reclamation

The Reclamation Plan prepared by Chemgold for the Imperial Project is provided as Appendix ~~C~~ A to this joint EIS/EIR.

2.1.11.1. Reclamation Goals

Chemgold has proposed to conduct reclamation activities in accordance with SMARA and the regulations found at 43 CFR 3809.1-3(d) and 14 CCR 3500. In general, the proposed Reclamation Plan includes measures for: protecting wildlife and the public; minimizing erosion and mass failure potential; demolishing structures and neutralizing process components; regrading selected side and cut-and-fill slopes; revegetation; and, where feasible, providing for the resumption of pre-mining land uses.

The proposed post-mining reclamation goals are to: reclaim the site to a stable, functioning landscape unit/ecosystem to allow for similar land uses as currently exist; establish conditions that would promote the long-term development of a vegetation community typical of the local area; and produce

reclaimed areas that are visually and functionally compatible with the surrounding topography. Implementation of the proposed Reclamation Plan would not limit the future development of mineral resources in the area, although some mineralization may be concealed after placement of waste rock in some open pits. Currently uneconomic precious metal resources within the walls and floors of the East Pit and the Singer Pit would remain largely accessible for future development. In addition, material in the waste rock stockpiles would be available for future development.

The Reclamation Plan relies primarily on natural processes and requires little intervention once site preparation is complete. Reclamation procedures proposed incorporate six (6) basic components:

- Establishment of a stable topographic surface and drainage conditions that are compatible with the surrounding landscape and serve to control erosion, including backfilling the open pit sufficient to raise the floor of the pit above the projected level of any pit lake if, at the end of mining, there is sufficient indication that ground water encountered in the open pit would create a pit lake.

- Establishment, where possible on waste rock stockpile tops, haul roads, pit bottoms, and facilities, of soil conditions conducive to a stable plant community through grading and reapplication of suitable growth material containing seeds.

- Revegetation of disturbed areas using native plant species endemic to the area in order to establish a long-term productive biotic community compatible with proposed post-mining land uses and capable of self-regeneration without long-term dependency on maintenance, soil amendments, or fertilizers, including:

  - Planting young ironwood and palo verde trees or seedlings along the channels which divert the throughgoing washes to test the reestablishment of the microphyll woodland habitat in acreage roughly equivalent to that acreage currently found along these channels within the Project mine and process area;

  - Adding seeds of the California Native Plant Society (CNPS)-listed, but locally common, endemic fairy duster (*Calliandra eriophylla*) and winged forget-me-not (*Cryptantha holoptera*) to the revegetation seed mix; and

  - Supplementing the existing natural revegetation seed mix with endemic species which provide additional browse for deer.

- Providing for public safety through stabilization, removal, and/or berming/barricading of structures or land forms that could constitute a public hazard.

- Minimization of the outward regrading or reshaping of slopes in order to reduce further impacts to undisturbed wildlife habitat.

- Enhancement of the long-term visual character of the reclaimed area.

The reclamation effort would consist of different methods to be applied, as appropriate, to reclaim different types of surface disturbance (see Table 2-3). Methods described in the table are further defined below:

Structure Demolition Facility Removal:	Demolition and removal of all building and structures within the Project area;
Neutralization:	Rinsing and neutralization of residual leach solution in the solution ponds and heap;
Backfilling:	Backfilling of selected pits;
Vehicle Access Rock Barricade:	Construction of rock barricades and posting of signs to exclude vehicle access;
Stable Slopes:	Design and construction of stable slopes on the heap; waste rock stockpiles, and pits;

Table 2-3: Reclamation Methods to be Applied to Areas Disturbed Within the Mine and Process Area

MINE FACILITY COMPONENT		RECLAMATION METHODS TO BE APPLIED								
		STRUCTURE DEMOLITION FACILITY REMOVAL	NEUTRALIZATION	BACKFILLING	VEHICLE ACCESS ROCK BARRICADE	STABLE SLOPES	REGRADING	SURFACE PREPARATION	REVEGETATION	NATURAL REVEGETATION
Mine and Process Area										
Pits	West Pit (see also Waste Rock Stockpiles)			X			X	X	X	
	Other Pits-Bottom							X	X	
	Other Pits-Slopes				X	X				X
Process Facilities	Heap Leach Pad-Top		X				X	X	X	
	Heap Leach Pad-Slopes		X				X	X	X	
	Process Facility Area (Solution Ponds and Process Facilities)	X	X				X	X	X	
	Lime Bin Area and Fresh Water Pond	X					X	X	X	
Waste Rock Stockpiles	Waste Rock Stockpiles-Top						X	X	X	
	Waste Rock Stockpiles-Slopes					X				X
Soil Stockpiles	Soil Stockpiles						X	X	X	
Support Facilities	Office/Maintenance/Parking/Emergency Power Area	X					X	X	X	
	Haul and Maintenance Roads						X	X	X	
	~~West Drainage Diversion-Temporary~~	~~X~~					~~X~~	~~X~~	~~X~~	
	~~West Drainage Diversion-Permanent~~						~~X~~		~~X~~	~~X~~
	Other Drainage Diversions-Permanent						X		X	X
Ancillary Area										
County Road Realignment-Temporary							X	X	X	
Powerline, Water Wells		X					X	X		X
Pipeline Route							X	X		X

Regrading:	Rough regrading of disturbed surface areas;
Surface Preparation:	Preparing surfaces through fine grading, ripping to loosen soil, topsoiling, and/or construction of water catchment basins;
Revegetation:	Reseeding and revegetation of disturbed surfaces; and
Natural Revegetation:	Enhancing disturbed surfaces for revegetation by natural means.

Figure 2-9 shows which areas of the Project mine and process area ~~which~~ would be subject to the specific reclamation methods outlined above.

2.1.11.2. Reclamation Activities

Reclamation activities would include: backfilling of selected pit(s) and regrading of disturbed areas; design and construction of stable slopes; reestablishment of drainages and implementation of erosion control procedures; demolition of structures and removal of facilities; and rinsing and neutralization of residual leach solution in the solution ponds and heap.

Concurrent Reclamation:

Reclamation of Project facilities would be initiated concurrent with continuing mining operations (concurrent reclamation) when individual components are no longer required for mine operations or when facilities are decommissioned. Removal of facilities, rough grading, and scarifying activities may occur at any time during the Project life. As operations progress, areas no longer needed for mining activities would be available for concurrent reclamation. Planned concurrent reclamation would focus on the stable diversion of surface water, as well as the stabilization of new or upgraded access roads, side and cut-and-fill slopes, solution pond berms, final waste rock stockpile benches and bare areas around buildings. The interim reclamation of soil stockpiles would consist of grading for stabilization and allowing natural revegetation from seed sources in the stockpile. Exploration roads would be reclaimed concurrent with mining operations when it is determined that the roads are no longer needed for exploration or mining operations. During active mining, concurrent reclamation in and around the pits would primarily be limited to controlling erosion of the

Figure 2-9: Reclamation ~~Levels~~ Methods Applied Within the Mine and Process Area

haul roads and slopes.

Closure and Post-Closure Reclamation:

Closure and post-closure reclamation would commence when the ore reserves are exhausted and mining has ceased. Leaching operations would cease after uneconomic recovery rates are reached. It is foreseeable that the heap leaching activities would remain active after mining activities have stopped, due to the length of time required to complete leach cycles. In this case, open pit and some related facility reclamation and closure activities would occur in advance of leach pad reclamation and closure.

It is estimated that the closure and post-closure phase of reclamation would take one (1) to three (3) years to complete following cessation of mining. Post-closure monitoring of revegetation success, and implementation of post-closure erosion control procedures, are expected to account for an additional three (3) years.

2.1.11.2.1. Backfilling and Grading

Waste rock and overburden would be placed on waste rock stockpiles adjacent to the pits or, as mining proceeds from one pit to the next, into previously mined-out open pits. The West Pit would be entirely backfilled. Subsequent backfill may then be placed into other open pits whenever access to additional economic mineralization is not impeded, or as may be necessary to raise the floor of the East Pit to a level higher than the level of any pit lake which may be eventually predicted to form from the inflow of ground water. If unanticipated circumstances arose necessitating a cessation of mining activities, no post-mining placement of waste rock in the pits would be conducted except as may be necessary to raise the floor of the pit above the predicted level of any pit lake which may be formed from the inflow of ground water.

During active mining, reclamation in and around the open pits may be limited to controlling erosion of the haul roads and slopes. Upon the completion of mining and any appropriate or necessary backfilling, the bottoms of the remaining open pits would be reclaimed by regrading (and revegetating) the haul roads and floors and leaving the slopes in a stable condition. Stable angles of the final pit highwalls would be determined by engineering analysis prior to final closure to ensure that no adjacent drainage diverts into an open pit due to failure of the wall.

All disturbed areas except the pit slopes and the waste rock stockpiles would be regraded, when no longer required for mine operations, as appropriate to create undulating land forms that are stable, do not allow for extensive pooling or ponding, and blend with the surrounding undisturbed topography. Final regrading on the tops and accessible slopes of the waste rock stockpiles and the leach pad, the bottoms of the open pits, and soil stockpiles would be conducted to minimize erosion potential and additional surface disturbance and facilitate the establishment of post-mining vegetation. Sharp edges would be rounded and straight lines altered to provide contours which are visually and functionally compatible with the surrounding terrain. In addition, regrading would entail the creation of water catchment basins to facilitate the revegetation of the disturbed areas. Regrading of other areas disturbed by facilities, roads, and the temporary stream diversions would be fine graded to enhance moisture for reclamation and revegetation.

2.1.11.2.2. Stable Slopes

Stable topographic surface and drainage conditions would be established that would control erosion, prevent sedimentation, and are compatible with the surrounding landscape. Slopes would depend on the type of material, erodability, and the practical considerations of the mining process. Overall slope grades would range from: 1H:1.2V (50 degrees) or steeper for the pit walls; 2H:1V (30 degrees) for waste rock stockpile slopes; 2H:1V (30 degrees) for leach pad slopes; and near-flat along the tops of waste rock stockpiles, the heap, haul and maintenance roads, and pit bottoms.

Pit wall slopes would be constructed during mining at angles consistent with long-term stability. Engineering analysis and Chemgold's experience at the Picacho Mine indicates that the slope of the ultimate pit walls would be 40 to 50 degrees to provide the required factor of safety for long-term slope stability. Each pit is to be developed in separate phases, which allows verification of slope stability parameters by subsequent engineering analysis during operations. Pit walls would have safety benches at regular vertical intervals to contain minor rock spills. Pit wall slopes may increase if actual mining conditions and geotechnical factors indicate that pit wall integrity could sustain steeper slopes. After closure, pit highwalls remaining in areas not utilized for waste rock stockpiling would be left in a stable configuration, subject to natural processes, and barricaded with boulders around the rim of the pit(s) to discourage access by the public and terrestrial wildlife over slopes which could constitute a hazard.

Upon final mine closure, the tops of the waste rock stockpiles would be rough-graded and ripped to prevent water pooling, ponding, and erosion, and to create water catchment basins to facilitate the revegetation of the disturbed areas. Stockpiled soil material would be distributed on the tops and the accessible level portions of the waste rock stockpile slopes prior to broadcast seeding with the proposed seed mixtures.

The sharp contours of the top and bottom of the leach pad would be rounded and softened, and the graded material extended outward far enough to overlap the perimeter berm that encircles the leach pad during active operations. Grading of the pad would leave in place the interceptor ditch around the pad, thereby diverting all runoff away from the pad area. Upon final mine closure, the top and slopes of the leach pad would be rough-graded and ripped to prevent water pooling, ponding, and erosion, and to create water catchment basins to facilitate the revegetation of the disturbed areas. Stockpiled soil material may be distributed on the top of the leach pad prior to broadcast seeding with the seed mixtures.

2.1.11.2.3. Drainage Reestablishment and Erosion Control

All surface drainages in the area are ephemeral, with flows occurring only during and following major precipitation events. Those sections of these existing washes which could convey storm waters around or through the Project mine and process area without impacting Project facilities would not be altered by the Project and would continue to carry storm flows through and around the Project mine and process area. However, several of these ephemeral drainages must be either temporarily or permanently diverted around the facilities located within the Project mine and process area. Each of the diversions has been designed to direct water back into the same major drainage system from which it was diverted. At no time would flows be diverted into other major drainage systems.

~~Energy dissipators would be constructed at the end of the channels as necessary to minimize the potential of erosion from the diverted run-off.~~ Permanent diversion channels would not be lined or rip-rapped, and upon completion of mining operations, any plastic liners installed in the temporary diversion channels would be removed and the temporary channels regraded and revegetated as appropriate. Permanent channel slopes and banks would be selectively planted with young ironwood and palo verde trees or seedlings to begin to reestablish microphyll woodland habitat.

To minimize erosion and the production of sediment, all channels, and adjacent streambank vegetation which is not to be directly impacted by the construction of Project facilities, would be left intact and protected from incidental disturbance from mine activities within the Project mine and process area. To minimize impacts from erosion on the Project area and down surface-gradient areas, all mine facilities, such as the heap leach facility, waste rock stockpiles, soil stockpiles, and roads, would be designed and constructed with appropriate erosion control features. Erosion control features would be designed to meet the performance standards of 14 CCR 3706. Additionally, in accordance with the Storm Water NPDES General Permit requirements, Chemgold will prepare and implement a Storm Water Pollution Prevention Plan (SWPPP), which is a site-specific plan to control drainage and erosion. Surface runoff and drainage from disturbed areas within the Project mine and process area would be controlled, collected, conveyed to sediment basins, and infiltrated (or consumed in mining or the heap leach process).

Methods to be employed, if necessary, to reduce or prevent the generation of sediment from within the Project mine and process area would include berms, sediment ponds, rip-rap, check-dams composed of straw bales, sand bags, silt fences, or other temporary techniques to minimize impacts. All surface runoff generated from disturbed areas within the Project mine and process area would be collected in the active pit(s), collected in the heap leach system and added to the process solution volume, or collected and directed to sedimentation basins for infiltration. No runoff from disturbed areas within the Project mine and process area would be directed into the existing drainage system. Erosion control methods would be designed to handle a twenty (20)-year/one (1)-hour intensity storm event, in accordance with standards established by 14 CCR 3706(d) (SMARA regulations).

2.1.11.2.4. Structure Demolition and Facility Removal

Fencing constructed for the Project operations would be maintained in-place until revegetation is completed and determined successful for bond release by the BLM and Imperial County. At that time, fencing would be removed.

The main haul road, all other Chemgold links in the road network around the mine, and all remaining exploration roads would be regraded, scarified, and revegetated. The relocated section of Indian Pass Road would be reconstructed ~~near its original position~~ adjacent and parallel to the diverted

west drainage channel following the completion of backfilling of the West Pit, and the realigned road segment regraded and reclaimed.

Buildings and ancillary facilities would be reclaimed by having all portable and salvageable structures removed and taken off-site. Any permanent below-grade structures and all building foundations would be buried. All surplus materials, storage containers and trash would be transported to a landfill authorized to accept this material. The remaining surplus waste products, and all fuel oil and similar materials, would be removed from the site and disposed of according to then-current state and federal regulations.

The on-site electric substation, the portion of the 92/~~7.5~~ 7.2 kV transmission line owned by Chemgold which would run from the existing Imperial Irrigation District (IID) 34.5 kV transmission line to the Project mine and process area, and the electric metering station would be removed. The remaining overbuilt 92 kV/34.5 kV transmission line, owned by the IID, would remain in place.

Ground water production and monitoring wells would be plugged and abandoned in conformance with applicable regulatory requirements (14 CCR 3713(a)). The buried ground water pipeline would be abandoned in-place.

2.1.11.2.5. Contaminant Control

The leach pad and process ponds would be designed as lined, zero-discharge facilities with leak detection systems, in conformance with CRWQCB requirements. The process ponds, and storm water overflow pond, would be designed with sufficient capacity to contain the normal operating volume of solution, and the rainfall run-off from the heap following a maximum probable one (1)-hour storm event occurring simultaneously with a 24-hour power outage, while maintaining a two (2)-foot freeboard. Process chemicals would be stored in secured areas in weather-proof containers, in accordance with local, state and federal regulations and company safety policies.

At completion of mining, the spent ore on the heap leach pad would be neutralized, regraded, and seeded as appropriate~~ in accordance with the Level Three guideline~~. Neutralization of the heap leach pile would be accomplished by rinsing with water to reduce cyanide levels to meet the requirements of the Waste Discharge Order Requirements (to be issued by the CRWQCB before use of the leach facility can commence). A neutralizing agent may be added

to the process waters and rinse solutions to reduce the cyanide level to meet CRWQCB standards. Sampling and laboratory testing would be conducted to evaluate and verify completion of the neutralization process at the conclusion of heap rinsing. This would likely require twelve (12) months of rinsing (based on Chemgold's experience to date with successful closing of three (3) heaps at the Picacho Mine).

All neutralized process waters and rinse solutions would be evaporated in the ponds or by sprinklers on the heaps, or land applied. Process water ponds would then be reclaimed, but the final neutralization and reclamation of the ponds would not occur until the neutralization of the heaps is complete to the satisfaction of the CRWQCB. All fencing would be removed and the pond areas graded to blend with the surrounding topography.

Any soil material contaminated by spills of regulated waste materials, such as fuel oil, waste lubricants or gasoline, would be collected, contained, and either remediated on the site (if permissible under then-current regulations) or removed from the site and disposed of in conformance with then-current regulations.

2.1.11.3. Revegetation Activities

Revegetation activities would include: salvaging and stockpiling of available soil; contouring and shaping accessible disturbed areas; revegetation test plots; reapplying soil materials as necessary; preparing seedbeds; seeding and transplanting; optimizing seed mixtures and rates by using locally collected seed; and monitoring and reporting. To aid in the revegetation of the Project area, the naturally vegetated areas between the disturbed areas, such as between roads and pits and the preserved portion of the central wash, would be managed as undisturbed buffers to serve as natural seed sources and provide protection for small mammals, birds, and reptiles.

2.1.11.3.1. Soil Salvage and Stockpile

Most of the Project mine and process area is located on old piedmont surfaces consisting principally of desert pavement which has a poorly developed soil profile and which is not suitable for salvage and use in reclamation. However, a few areas within the Project mine and process area, principally in the shallow washes and adjacent slopes, have shallow soils with suitable texture which can be salvaged. Stripping of these soils to the greatest depth practicable (generally 12-18 inches) would lead to the salvage of an

estimated maximum of 112,200 cubic yards of soil. Soil would be stockpiled at four (4) soil stockpile sites (see Section 2.1.6).

2.1.11.3.2. Contouring and Shaping

Initial rough grading would blend the top edges and crests of the waste rock stockpiles and the heap and construct the permanent diversion channels. Final grading would construct water catchment basins for revegetation on the tops of the waste rock stockpiles and leach pad. Potential drainage and erosion processes would be important considerations in the design for shape and size of these small water catchment basins. In general, most flat or gently sloping areas would be considered for the construction of the water catchments. Additionally, these catchment basins would be constructed on the side slopes of the heap leach pad.

2.1.11.3.3. Revegetation Test Plots

The Project seeding and revegetation plan has been developed with the information gained from the revegetation test plots and concurrent reclamation conducted to date at Chemgold's nearby Picacho Mine. Additional information regarding successful revegetation developed from Chemgold's experiences at the Picacho Mine would be used, in consultation with, and with the approval of, the BLM and Imperial County, to finalize the Project seeding and revegetation plan.

2.1.11.3.4. Soil Reapplication

Stockpiled soil containing seeds from the Project area would be distributed as equitably as possible to all the areas to be revegetated. Little to no soil may be necessary on the neutralized heap to achieve revegetation success, based upon experience at Chemgold's Picacho Mine. Where necessary, compacted areas would be ripped prior to application of the salvaged soil. Soil would be placed on the prepared areas in the early fall or immediately after final grading, just prior to seeding. Soil placement would be inspected periodically to ensure that a sufficient depth of material is being placed, generally one (1) to two (2) inches, to provide a seed source. The surface would be left in a rough or furrowed state to reduce wind and water erosion and to increase available moisture in the surface soil layer.

2.1.11.3.5. Seedbed Preparation

Seedbed preparation, seeding, and transplant efforts for areas to be revegetated would take place after grading, stabilization, and growth media placement when soil moisture conditions are favorable. Compacted surfaces would be loosened and left in a rough condition by ripping. In selected areas, Chemgold may utilize moisture enhancement basins to promote seed germination and plant growth, and stabilize the surface material from wind and water erosion. These moisture enhancement basins catch natural precipitation, store the water in the soil, and take advantage of natural conditions so irrigation is not necessary.

2.1.11.3.6. Seeding and Planting

The intended seeding mixture is that which is collected from the natural sources located on the Project area. The revegetation -seeding rates would be finalized based upon results from test plots at the Picacho Mine and consultation with the BLM, Imperial County, and the California Department of Fish and Game (CDFG) (as to deer browse). Chemgold, or Chemgold contractors, would collect, prepare, and store native seed for use in reclamation. During final reclamation, the seed mixture would include native plant seeds collected in the local area designed to increase available browse for deer. Any substitutions to the approved native seed would require reapproval by the BLM and Imperial County prior to use.

Seeding would be performed using hand-held seed spreaders or by broadcast seeding in steeper terrain. Seed would not be sown uniformly, but would be concentrated in those areas with better soil moisture retention, such as the moisture catchment basins and at the base of slopes. For broadcast applications, equipment such as a "cyclone" spreader would be used to distribute native live seed immediately after grading when surfaces are rough. Sowing seed by hand was also found to be an acceptable method on rough substrate. Dragging with a light chain or other means to provide some soil cover on the seed did not prove to be necessary if seed is applied immediately on roughened soil surfaces.

Plants deemed valuable for transplanting, such as cactus, ocotillo and young ironwood and palo verde trees or seedlings, would be collected from the Project area prior to surface disturbance. Additionally, seedlings of some species may be grown from seeds collected from the area or equivalent sources. These plants would be carefully placed into prepared locations.

2.1.11.3.7. Schedule

Soil distribution and revegetation activities are limited by the time of year during which they can be effectively implemented. Transplanting of live salvaged plant specimens is best conducted in the late fall. Seedbed preparation and seeding during the late fall or early winter takes advantage of soil moisture received during winter. Germination and growth would be encouraged for most seeds of the native species which are fall or winter germinators. Reclamation has a better chance for success in years with average or above-average precipitation, especially if adequate moisture is available during the November through April time period.

2.1.11.3.8. Weed Control

Weed control in this extreme desert climate has not proven to be a problem at the nearby Picacho Mine or at other mines in the Cargo Muchacho Mountains. Only a few species of exotic plants, generally grasses, have appeared during revegetation efforts. Tamarisk is known to invade wet areas around pits and leach pads. These plants would be periodically controlled through hand eradication over the life of the Project. Based on the extent of the problem, selective spraying with a herbicide would be considered. Other weed species in revegetated areas would be managed only if they should threaten the success of the proposed reclamation.

2.1.11.4. Monitoring and Reclamation Success Evaluation

Revegetation monitoring would be conducted for a minimum of three (3) years following implementation of the post-closure revegetation activities, or until the revegetation success, as defined in Section 2.1.11.4.1, has been achieved. At a minimum, monitoring activities would take place during the peak growth and flower time, usually in April or May. Vegetation monitoring of the site during subsequent years would occur based on seasonal precipitation or other weather conditions.

2.1.11.4.1. Vegetation Monitoring

The goal of the revegetation program is to establish a vegetative cover over the reclaimed area. This depends upon creating a stable situation that would promote the long-term development of a vegetation community typical of the local area. Vegetative cover (the vertical projection of the crown or shoot area of a species to the ground surface expressed as a percent of the total reference area), vegetative diversity (the distribution and abundance of

different plant species within a given reference area), and vegetative density (the number of individuals or stems of each species rooted within a given reference area) would be used as the monitoring parameters.

To determine if the revegetation efforts were successful, comparisons would be made between revegetated sites and sites not disturbed by mining activities. To ensure that the analysis of the undisturbed vegetative community would be statistically valid to within an 80 percent confidence interval, vegetation parameters of the perennial herbaceous and shrub species plus cover of annual species would be sampled in areas adjacent to proposed disturbed sites. Similar vegetation studies would be monitored in areas adjacent to proposed disturbed sites.

After completion of reseeding activities and a suitable growth period, a series of linear plots would be established in the reseeded areas and monitored on an annual basis for a minimum of three (3) years to establish trends in the revegetation success. Chemgold would consider revegetation successful when the monitoring shows the establishment of 30 percent or more of the vegetative cover, 20 percent or more of the vegetation density, and 15 percent or more of vegetation diversity of the perennial shrub and herbaceous vegetation in the monitored reclaimed and revegetated areas, as compared to the current year's monitored sample sites.

In the event of initial failure of the revegetation, Chemgold would consult with the BLM and Imperial County regarding remediation alternatives and revegetation measures that should be undertaken.

2.1.11.4.2. Erosion Monitoring

Techniques used to control the production of sediment include the overall grading design and the revegetation plan. Any storm water surface flows entering the Project mine and process area would be routed away from the project facilities with diversion channels. Additional methods to be employed, if necessary, would include berms, sediment ponds, rip-rap, check-dams composed of straw bales, sand bags, silt fences, or other temporary techniques to minimize impacts. All surface runoff generated from disturbed areas within the Project mine and process area would be collected in the active pit(s), collected in the heap leach system and added to the process solution volume, or collected and directed to sedimentation basins for infiltration. Erosion control methods would be designed to handle a twenty (20)-year/one (1)-hour intensity storm event, in accordance with standards established by 14 CCR 3706(d) (SMARA regulations), and deliver diverted storm waters to

natural drainages at velocities that minimize erosion. Additionally, in accordance with the Storm Water NPDES General Permit requirements, Chemgold would prepare and implement a Storm Water Pollution Prevention Plan (SWPPP), which is a site-specific plan to control drainage and erosion.

If excessive erosion and sedimentation are observed during the mining operations or exploration activities, then modifications to the erosion control methods would be made.

2.1.11.4.3. Reporting

An annual report summarizing the findings of the reclamation monitoring program would be submitted to the BLM and Imperial County each year following the commencement of monitoring. The report would include the acreage disturbed and reclaimed for the current year as well as for the Project to date, the acreage to be disturbed and reclaimed in the future, and document reclamation successes and failures and the extent of reclamation activities. Information obtained during the previous year's reclamation activities would be reviewed, and any necessary modifications to the Reclamation Plan and appropriate bonding requirements presented for incorporation into the ongoing reclamation activities upon approval by the BLM and Imperial County.

2.1.11.5. Financial Assurance

To establish an acceptable bonding instrument for the BLM, Imperial County and the California Department of Conservation, Chemgold would allocate funds to post an irrevocable letter of credit for an amount consistent with the calculated physical reclamation cost estimate of approximately $400,000.00, subject to agency review and approval. Separate financial assurance to cover the neutralization of the heap would be posted with the CRWQCB to meet that agency's separate bonding requirements.

2.1.12. Other Environmental Impact Reduction Measures

Chemgold has proposed the following additional environmental impact reduction measures which have not otherwise been identified above:

- Construction of a fence generally equivalent to the Project perimeter fence entirely around the south-central portion of the central wash within the Project mine and process area which is not intended to be disturbed by Project operations to prevent accidental surface disturbance of the microphyll woodland habitat in this internal area during mine construction and operation.

- Providing periodic irrigation over the life of the Project to vegetation within the south-central portion of the central wash as may be appropriate to enhance the quality of microphyll woodland habitat in this drainage.

- Construction of a big game guzzler in a design and location acceptable to the BLM and the California Department of Fish and Game (CDFG) in the general vicinity of the Project mine and process area to mitigate the loss of habitat for deer and other wildlife.

- Providing periodic irrigation over the life of the Project to the western slopes and banks of the existing ephemeral stream channel immediately adjacent to, but outside of, the east-southeast boundary of the Project mine and process area as may be appropriate to enhance the quality of existing microphyll vegetation and available deer browse on this area of this channel.

- Conducting annual transect surveys of the major through-going ephemeral stream channels upstream and downstream of the Project mine and process area to monitor these drainages with respect to existing vegetation and microphyll woodland habitat.

- Document any potentially adverse erosional or depositional processes, and document any sightings of deer fawn, bighorn sheep and any other significant wildlife species.

- Construction following the completion of reclamation of one or more big game and/or small game guzzlers within the Project mine and process area in a design and location acceptable to the BLM and the CDFG to enhance the restored site as habitat for deer and other wildlife.

- Preparation of a hazardous material spill/release contingency plan which provides appropriate training to all Project employees on the proper response to potential chemical releases.

2.2. Alternatives

2.2.1. Reduced Project Alternative

Under the Reduced Project Alternative, the total tons of ore and waste rock to be mined would be decreased from that proposed under the Proposed Action. The scale of the project would fall somewhere between the No Action Alternative and the Proposed Action, depending on the actual amount of reduction in the project scope.

The smallest Reduced Project Alternative which would likely remain economically viable would be the mining of only the West Pit and the Singer Pit, including portions of the Mineralized Potential Area, and the accompanying construction of the necessary heap leach pad and waste rock stockpile(s) with appropriate capacities. Figure 2-10 provides a ~~potential~~ layout for such a project. As compared to the Proposed Action, this Reduced Project Alternative would likely eliminate the surface area otherwise disturbed by: the East Pit; the "east" waste rock stockpile; the south soil stockpile; and one of the north soil stockpiles. Compared to the Proposed Action, the Reduced Project Alternative would also reduce the surface area disturbed by: mining of the Mineralized Potential Area; the heap leach pad; the "south" waste rock stockpile; and the haul and maintenance roads. Estimates of the surface area disturbed by the Reduced Project Alternative are presented in Table 2-4. The total estimated tons of ore mined would be reduced by approximately 55 percent (Personal Communication - C.K. McArthur, Chemgold, 1995). This alternative would reduce the total amount of mined material to approximately 270 million tons (202.5 million tons of waste rock and 67.5 million tons of ore), assuming a 3:1 waste rock to ore ratio.

Figure 2-10: Reduced Project Alternative - Mine and Process Area Facility Details

Table 2-4: Estimated Disturbed and Undisturbed Acres for the Reduced Project Alternative

MINE FACILITY COMPONENT		DISTURBED ACRES	UNDISTURBED ACRES
Mine and Process Area			
Pits	West Pit	124	
	East Pit	0	
	Singer Pit	34	
	Mineral Potential Area	68	
	Subtotal:	**226**	
Process Facilities	Pad	200	
	Process Facility Area	21	
	Lime Bin Area and Fresh Water Pond	1	
	Subtotal:	**222**	
Waste Rock Stockpiles	East Waste Rock Stockpile	0	
	West Waste Rock Stockpile~~s (two adjacent stockpiles)~~	~~28~~20	
	South Waste Rock Stockpile	180	
	Subtotal:	**~~208~~200**	
Soil Stockpiles	West Soil Stockpile	3	
	North Soil Stockpiles (two adjacent stockpiles)	21	
	South Soil Stockpile	0	
	Subtotal:	**24**	
Support Facilities	Office/Maintenance/Parking/Power	14	
	Haul and Maintenance Roads	120	
	Drainage Diversions	11	
	Subtotal:	**145**	
Mine and Process Area Subtotals:		~~825~~817	~~190~~175
Total Mine and Process Area Acreage:		**~~1,015~~992**	
Ancillary Area			
County Road Realignment		7	
Powerline, Water Wells and Pipeline Route		29	
Ancillary Area Subtotals:		36	-
Total Ancillary Area Acreage:		**36**	
TOTAL PROJECT AREA DISTURBED AND UNDISTURBED ACREAGE:		**~~861~~853**	**~~190~~175**
TOTAL PROJECT AREA ACREAGE:		**~~1,051~~1,028**	

Under the Reduced Project Alternative, the expected mine life would be reduced from the approximately twenty (20) years under the Proposed Action to approximately

ten (10) years. Since the East Pit would not be mined under the Reduced Project Alternative, there would be no waste rock from the East Pit available to backfill the West Pit (see Figure 2-11 for the Reduced Project contours following the completion of mining but before the implementation of final reclamation). Because the West Pit would not be backfilled to the surface, Indian Pass Road would not be relocated back to its original alignment. However, at the end of mining Chemgold would conduct an assessment, and if the assessment reasonably indicates that ~~there is sufficient indication that~~ ground water encountered in the West Pit may enter the pit in sufficient quantity in spite of evaporation to create a pit lake, Chemgold would then place sufficient backfill into the open West Pit to raise the floor of the pit to a level higher than the level of any pit lake which may be ~~eventually~~ predicted to form from the inflow of ground water.

2.2.2. Complete Pit Backfill Alternative

The Complete Pit Backfill Alternative consists of the complete filling of all of the open pits with mined material to at least original grade. ~~In practice, this~~ This would ~~likely~~ consist of first completing the Proposed Action as proposed. Subsequent to the completion of mining, and concurrent with the final leaching of ore and the commencement of final reclamation, waste rock would be loaded back into the existing haul trucks, which would be driven to the edge of the open pit(s) and the waste rock dumped into the pit(s).

One ton of broken rock occupies a greater volume than one ton -of solid rock. As a result of this "expansion," or "swell factor," all of the rock mined from an open pit will not fit back into that same pit. As currently planned, the total amount of ore and waste rock to be mined as part of the Proposed Action would be approximately 600 million tons, equalling a volume of approximately 287 million cubic yards. Of this 600 million tons, approximately 450 millions tons would be placed on the waste rock stockpiles or back into the West Pit, and approximately 150 million tons would be placed on the heap leach pad. Based on estimated broken densities of 18 cubic feet (0.67 cubic yards) per ton for mined waste rock and 20 cubic feet (0.74 cubic yards) per ton for mined ore, the total volume for all the mined waste rock would be 301.5 million cubic yards, while the mined ore would occupy 111 million cubic yards, for a total of approximately 412.5 million cubic yards of mined material. Under the Complete Pit Backfill Alternative, all of the pits are to be completely backfilled to grade, which is equal to a volume of approximately 287 million cubic yards. It is assumed that approximately 287 million cubic yards of waste rock would be returned to the open pit. The spent leached ore would remain on the heap leach pad, and the remaining approximately 13 million cubic yards of waste rock would remain on the waste rock stockpile(s). Figure 2-12 provides a potential layout for such a project, showing the final residual contours prior to reclamation.

Figure 2-11: Reduced Project Alternative - Mine and Process Area Projected Final Contours

Figure 2-12: Complete Pit Backfill Alternative - Mine and Process Area Projected Final Contours

Since approximately 120 million cubic yards of waste rock would already have been dumped into the West Pit, ~~only~~ approximately 167 million cubic yards would have to be excavated from the waste rock stockpiles and dumped into the open portions of the East Pit. Assuming that the mine equipment can move a maximum of 130,000 tons (~~2.35~~ 2.34 million cubic feet, or ~~87,100~~ 86,700 cubic yards) of excavated material per day, it would require approximately 5.25 years (5 years, 3 months) to move enough waste rock back into the open pits to fill them all to grade. Because the rock is already broken and could be loaded more quickly, and because the haul trucks would be traveling loaded down grade, rather than up grade, backfilling operations may be able to be conducted more quickly. However, because the loading and hauling equipment will be near the end of their useful lives, down time due to equipment maintenance or failures will likely increase substantially over that experienced during initial mining.

Assuming a cost of approximately $0.50 per ton of material moved (Personal Communication - Steve Baumann, Chemgold, Inc., 1996), the total additional cost of completely backfilling the East Pit would be approximately $125 million. Chemgold (Personal Communication - Steve Baumann, Chemgold, 1996) has indicated that this cost exceeds the anticipated return on the Project, and has stated that such a project would not be pursued by a prudent project developer.

Once the pits were backfilled to grade, ~~and all required material moved from the waste rock stockpiles,~~ the backfilled pits and remaining waste rock stockpiles could be reclaimed.

The Complete Pit Backfill Alternative would not result in any reduction of disturbed areas compared to the Proposed Action since the Complete Pit Backfill Alternative includes completion of the Proposed Action. However, a substantial amount of the surface area disturbed by waste rock stockpiles would be reclaimed "at grade," and not reclaimed as a ~~stock~~pile, since most of the waste rock ~~contents of~~ from the stockpiles would have been removed and dumped into the open pits.

2.2.3. No Action Alternative

The No Action (no project) Alternative forms the baseline from which the impacts of all other alternatives can be measured. Such action would generally not be consistent with the BLM multiple use mission and policy of making public lands available for a variety of uses, as long as these uses are conducted in an environmentally sound manner, since the subject lands were not withdrawn for any special use and were open, unappropriated lands when unpatented mining claims were staked. If the No Action Alternative is implemented, the Project area would remain

as is, and present uses in the area, including off-highway vehicle use, camping, hunting, and rockhounding, could continue. The site would remain available for future commercial gold processing proposals or for other proposals as permitted by BLM policy or land use designations.

2.2.4. BLM Preferred Alternative

The BLM Preferred Alternative is the alternative that best fulfills its statutory mission and responsibilities, giving consideration to economic, environmental, technical and other factors. BLM believes that the Preferred Alternative is the Proposed Action.

2.3. Alternatives Eliminated from Detailed Consideration

2.3.1. Facility Location Alternatives

2.3.1.1. Alternative Heap Leach Pad Location

The proposed location of the Project heap leach pad was selected by Chemgold after consideration of several environmental and operational factors. These factors were: proximity to the open pits; efficiencies in the construction and operation of the heap leach facility, including a consolidated project layout; desire for gravity flow from the leach pad to the processing facility; avoidance of sensitive environmental resources; and absence of economic mineral reserves or potential economic reserves below the heap leach pad.

Relocation of the heap leach pad from its proposed location to another location within the Project mine and process area would increase the distance from the three (3) open pits, contributing to higher costs, operational inefficiencies, and increased haulage-related emissions. Since there is no operational advantage to relocating the leach pad to any other location within the Project mine and process area, and there appears to be no environmental advantage to be gained by relocating the heap within the Project mine and process area (since all potential areas are to be disturbed, except for the drainages), this alternative was eliminated from further consideration.

Other alternative heap leach pad locations outside of the proposed Project mine and process area to the east or south could be designed, although any of these locations would greatly increase the distance from the three (3) open pits, and lead to substantially higher costs, operational inefficiencies, and increases in energy consumption and haul vehicle emissions. In addition, moving the heap leach pad away from the pits has the potential to create additional environmental

effects from longer haul roads and the isolation of habitat between two (2) major project facilities. Since there is no operational advantage to relocating the leach pad outside the Project mine and process area, and such a relocation appears to create additional environmental impacts, this alternative was eliminated from further consideration.

2.3.1.2. Alternative Waste Rock Storage Areas

The major considerations in selecting locations for the waste rock stockpiles are: minimization of the truck haul distance and gradient from the open pit to the waste rock storage areas (and related costs); consolidation of mine facilities; adequate waste rock storage capacity; avoidance of sensitive environmental resources; and absence of economic mineral reserves or potential economic resources below the waste rock storage area.

Possible alternative locations for waste rock storage exist both inside and outside of the proposed Project mine and process area. However, disposal of the waste rock outside of the proposed Project mine and process area is operationally and environmentally undesirable for the same reasons that location of the heap leach pad outside of the proposed Project mine and process area is undesirable (substantially higher costs, operational inefficiencies, increases in energy consumption and haul vehicle emissions, and isolation of habitat). Since there is no operational advantage to relocating the waste rock stockpiles, and such a relocation appears to create additional environmental impacts, this alternative was eliminated from further consideration.

2.3.1.3. Alternative Water Sources

The Proposed Action includes the development of a well field approximately 4 miles ~~near the~~ southwest ~~corner~~ of the Project mine and process area to provide the water required for the Project. Up to four (4) water wells are planned along a 1.5 mile section of Indian Pass Road within the Project ancillary area (see Figure 2-1). These wells would be connected to the Project mine and process area by pipeline. One well has already been drilled. Specific locations for the three (3) undrilled ground water wells within the Project ancillary area have not yet been selected, although they would be located along the ~~surveyed portions~~ designated section of Indian Pass Road.

Alternative locations for the water well field may exist within the vicinity of the Project mine and process area. The selected well field area has the highest potential for the successful development of ground water resources within a moderate distance of the Project mine and process area. The other alternatives

would either have a lesser potential for success or be substantially farther away. Accordingly, alternative ground water well fields were eliminated from further consideration as alternative water sources.

The only other possible sources of water would be the use of existing surface water resources, either from the Colorado River or the All American Canal. In each case, there appear to be no rights to these waters which can be legally or economically obtained by Chemgold. The 115 afy Colorado River water right currently used by Chemgold for its existing Picacho Mine Project (see Section 5.2.1.3) cannot be transferred (Personal Communication - C.K. McArthur, Chemgold, 1995), and is only approximately 10 percent of the water needed by the Project. Transportation of the required quantity of water from the Colorado River or the All American Canal to the Project could not be accomplished by any means other than pipeline, which would require construction through environmentally sensitive areas and substantial energy expenditures for pumping the water. Since there are no surface water rights sufficient to supply the water requirements of the Project, and moving any surface water to the Project mine and process area appears to create additional environmental impacts, this alternative was eliminated from further consideration.

2.3.1.4. Utility Power Supply Alternatives

Peak Project electrical power requirements of approximately 8 MW would be supplied ~~by a local~~ from the utility system, which would include the "overbuilding" of an existing 34.5 kV transmission line for approximately 16 miles with a new 92 kV transmission line. A new 92 kV transmission line would then be built to the Project mine and process area. Alternative utility sources of this power were considered, but each was eliminated from further consideration for the reasons provided below.

Use of the existing IID 34.5 kV transmission line without upgrade to 92 kV was eliminated by the IID as not capable of transmitting the required 8 MW of power. Use of an existing Western Area Power Authority (WAPA) 161 kV transmission line, which runs parallel and adjacent to the IID 34.5 kV transmission line, was also considered. Two (2) alternative points of interconnection to the WAPA transmission line were considered. One would require the construction of a small 161 kV/34.5 kV substation to take power off of the WAPA line at the point where the WAPA line crosses Indian Pass Road (see Section 2.1.9.3). A 34.5 kV transmission line would then be built parallel to Indian Pass Road to bring power to the Project mine and process area. A second alternative would bring power off of the WAPA 161 kV transmission line at the existing Gold Mine Tap substation, located approximately 8 miles northwest of

the Project mine and process area. A new 92 kv transmission line would be constructed south-southeast, parallel to the existing 161 kV transmission line, for approximately four (4) miles. There, the line would be "overbuilt" on the existing 34.5 kV IID transmission line. Finally, the line would turn east and run approximately 5 miles over new ground to the Project mine and process area. However, WAPA determined that it could not provide the Project with ~~a~~ "firm," or non-discretionary, capacity to transmit the power, thus eliminating any WAPA 161 kV transmission alternative from further consideration.

2.3.1.5. Electrical Power Generation Alternative

Peak Project electrical power requirements would be reduced to less than approximately 2.8 MW if the Project used diesel-powered shovels or loaders instead of electric shovels. To provide power to all of the other facilities located within the Project mine and process area, the Project would install diesel-powered electrical generators at the Shop and Office Facility area instead of overbuilding the 34.5 kV transmission line to connect to ~~a local~~ the utility system. Two (2), 2,000± kW, pre-packaged, diesel generator sets would likely be installed, with one (1) of the installed diesel generator sets being reserved principally as a backup to the operating set. Additionally, two (2), 800± kW, pre-packaged, diesel generator sets would be installed adjacent to one (1) of the ground water production well locations to provide electrical power to the well pump(s). One (1) of the installed diesel generator sets would also be reserved principally as a backup to the operating set. A 7.2 kV distribution line would be built adjacent to the ground water well access road(s) to supply electrical power from the generator(s) to the other ground water well pumps. Annual diesel fuel consumption would rise from approximately 4 million gallons to approximately 5 million gallons. Because this alternative consumed more diesel fuel, creating more on-site air pollution, and did not appear to substantially reduce any of the environmental impacts of the Proposed Action, it was eliminated from further consideration.

2.3.2. Alternative Mining and Processing Methods

2.3.2.1. Underground Mining Alternative

Any proposed mining operation has a minimum ore grade which can be mined profitability, considering the operating, capital, and investment costs evaluated together with a reasonable rate of return. In determining the minimum ore grade that can be profitably mined, the deposits are evaluated in small blocks, which are each assigned a uniform ore grade value based on detailed development drilling. The minimum ore grade that can be mined is the average of the grades of all

blocks proposed to be mined. A model of the ore blocks is developed which focuses on the maximum yield for the minimum amount of ore and waste that would have to be mined. Increased costs in any phase of the operation would require that a higher grade ore be mined to maintain profitability, which conversely means that less ore can be mined from the deposit.

The underground mining method best develops structure-dependent deposits such as quartz veins, shear veins, and shear swarms. Development of underground deposits requires complex technical capabilities and engineering design, which is expensive, and are extremely labor intensive. Normal processing methods for this ore consist of crush-mill operations, and recovery is by gravity separation, chemical leaching, or combinations of both. Cash costs associated with underground mining operations are about $60.00 to $70.00 per ton of mined ore, due largely to the labor-intensive, low-productivity nature of these operations. Thus, underground mining results in higher operating costs and higher capital costs per ton of ore mined. At a gold sale price of $400.00 per ounce, a minimum underground minable grade is typically at least 0.15 ounces of gold per ton of ore.

From the distribution of ore grade and tonnage for the Project deposits, no ore is present within the Project deposits that falls above the minimum grade for underground mining. Therefore, underground mining is not economically feasible for the Project, and this alternative was eliminated from further consideration.

2.3.2.2. Vat Leaching Process Alternative

The vat leaching process is somewhat similar to heap leaching, except that the ore is first crushed to a fine particle size, then leached in large, shallow tanks. Vat leaching is an appropriate technique to employ with ores with rapid gold dissolution rates, typically extraction rates of no more than three (3) days. It is more capital intensive than heap leaching, requiring more surface facilities, including the leach tanks. Vat leaching produces the same amount of leached material as the heap leach process per ton processed, although the vat leaching process creates wet tailings rather that heaped material. Vat leaching also consumes substantially more water than heap leaching for the same quantity of material processes.

Processing the Project ore by vat leaching would still lead to mining the ore deposits as proposed. However, because vat leaching increases operating costs, only higher grade ore could be profitably mined and leached, which would lead to a substantial decrease in the quantity of mined ore and possibly an increase in the quantity of mined waste rock. Surface disturbance from mining operations would

likely remain very similar to that of the Proposed Action, for while no heap leach pads are necessary for vat leaching, tailings from the vat leaching cycle would occupy a much larger area than the heap leach pads since the material could not be stacked as high.

Because metallurgical testing of Project ores indicates the necessity of leaching periods in excess of 90 days to reach ultimate gold extraction levels, vat leaching is not an operationally feasible alternative for Project ores. In addition, the vat leaching alternative appears to have environmental disadvantages over the proposed heap leach process because of the air emissions from crushing the ore and the requirement for tailings disposal. Accordingly, this alternative was eliminated from further discussion.

2.3.2.3. Carbon-in-Pulp Leaching Process Alternative

The carbon-in-pulp (CIP) method of gold extraction requires the consumption of substantial energy to grind crushed ore material to fine particle sizes that both liberates the gold and exposes the maximum mineral surface area. Due to the need for substantial grinding facilities and structures, this alternative process requires considerably more capital investment and would incur greater operating costs (due to higher energy requirements) than the heap leach process. A similar amount of land area is generally required for the carbon-in-pulp and vat leaching process alternatives, both of which use substantially more land for the storage of wet tailings than the heap leach process. Substantial additional capital is also required to construct suitable tailings containment facilities and associated process equipment.

Because of these considerations, CIP leaching is typically more appropriate for the higher grade ore bodies, those in excess of 0.05 ounces of gold per ton of rock. This higher grade of gold does not exist in sufficient quantities to justify a profitable Project mine. In addition, the CIP alternative appears to have environmental disadvantages over the proposed heap leach process because of the requirement for tailings disposal. Accordingly, this alternative was eliminated from further discussion.

2.3.2.4. In-situ Leaching/Carbon Adsorption Process Alternative

In-situ leaching involves the injection of leaching solution directly into an ore body while it is still in place in the ground. The gold-bearing solution is recovered by pumping from extraction wells, and processed by carbon adsorption. The method requires suitable geologic formations to confine the solution until it can be recovered. If the gold-bearing deposits are not defined between formations

which would contain the leaching solutions, the potential for adverse effects to ground water and soils may be substantial.

Many linear geologic structures, such as faults and shears, are located within the Project mine and process area, and are pervasive within the overall Project area. These structures could serve as conduits for solutions injected to leach the ore deposits to travel beyond the control of the operator. The risk of ground water and soil contamination by use of this method for the Project deposits precludes its consideration as a viable and environmentally safe alternative, and thus it was eliminated from further consideration.

2.3.2.5. Flotation Alternative

The flotation method of gold extraction is used for ores containing appreciable quantities of sulfide minerals. Physical observations, microscopic analysis, and metallurgical tests conducted to date have confirmed that the Project ore is essentially sulfide-free. Consequently, flotation is not considered suitable for the Project, and this alternative was eliminated from further consideration.

3. AFFECTED ENVIRONMENT

3.1. Geology and Mineral Resources

3.1.1. Geological Setting

The Project mine and process area is located in southeast California within the Colorado Desert portion of the Basin and Range physiographic province along the southwestern flank of the Chocolate Mountains (Norris and Webb, 1976). The southeastern portion of the Chocolate Mountains consists largely of Jurassic age gneisses and schists overlain by Tertiary age basalts, fanglomerates, and Quaternary age alluvium (see Figure 3-1 ~~Figure 2-1 of Appendix D of this EIS/EIR~~). A thin veneer of flood basalt caps the gravel and forms distinct ridges and land forms (Clark, 1970).

About 95 percent of the Project mine and process area consists of Quaternary age alluvium (in the active ephemeral stream channels) and older alluvium (in the upland areas), which vary in thickness from 10 to ~~700~~ 1,000 feet. Below the Quaternary age sediments, the geologic section in the Project mine and process area consists of the Jurassic schist and gneiss units unconformably overlain by Tertiary andesite and basalts (see Figure 3-2). The lowermost unit that will be exposed during mining activities is an undifferentiated Jurassic gneiss which forms the footwall to the orebody (Personal Communication - Dan Purvance, Chemgold, Inc, 1996). Generally above the undifferentiated gneiss is a biotite gneiss which has sericitic schist zones that appear to be structurally and/or hydrothermally localized. The biotite gneiss varies from a white quartzo-feldspathic rock to a dark gray hornblende-biotite gneiss. Often the biotite gneiss has a shatter-breccia texture that is variably cemented by iron oxides, clays and less commonly quartz or carbonate. The sericitic schist is a white, red-to-tan iron-oxide-stained rock composed predominantly of sericite with minor quartz. The sericite schist is weak and highly foliated.

A discontinuous horizon of Tertiary basalt flows and volcanicistic mudflows (and/or paleosoil horizons) with basaltic fragments rest unconformably on the Jurassic rocks (Personal Communication - Dan Purvance, Chemgold, Inc, 1996). This volcanic unit is discontinuous and thin, ranging from zero (0) to 100 feet in thickness within the Project mine and process area. A Tertiary age conglomerate overlies the volcanics, or lies directly on the Jurassic metamorphics where the volcanics are absent. The conglomerate is typically a moderately well indurated, clay/carbonate/iron oxide-cemented material with coarse, subangular gneissic fragments in a moderate- to coarse-grained sand matrix with considerable mica component. Zones of finer-grained material, including silty sands and silts, are present locally.

Figure 3-1: Generalized Regional Geologic Map

Figure 3-2: Simplified Geologic Cross Section through the West Pit ~~Project Mine and Process Area~~

Dominant regional structural features include the Chocolate Mountains thrust fault, which placed basal gneissic rocks over the younger Orocopia Schist (see Figure 3-1), and the San Andreas fault system. The Project mine and process area is structurally aligned and equidistant between the Picacho and Mesquite gold deposits. A complex geologic setting exists within the area as evidenced by detachment fault features identified at the Picacho and American Girl mines and intricate strike-slip fault systems identified at the Mesquite Mine (Tosdal, et al., 1991). Structural patterns within the Project mine and process area identified by exploration drilling to date consist of west-northwest to northwest trending faults cut by northeast trending high angle faults (Personal Communication - Dan Purvance, Chemgold, Inc, 1996). A south-southwest dipping low angle fault bounds the orebody at its base and along the north side (see Figure 3-9). ~~[note - I removed the discussion regarding shear zones since it is better explained on page 3-9. However, the statement as included may remain "confusing" by talking about faults, not localized shear zones.]~~

The Imperial Valley is at the southern end of the San Andreas Fault system, probably the most studied and best known fault system in the United States. The San Andreas system transects the northeastern margin of the Imperial Valley approximately 63 miles northwest of the Project area (see Figure 3-3). Other major Holocene faults also shown within the region on Figure 3-3 include several faults which parallel, or are "en echelon," to the southern section of the San Andreas Fault, most notably the reported East Mesa Fault, the East Highline Canal lineament, the Imperial-Brawley Seismic Zone, the Superstition Hills Fault (San Jacinto Fault Zone), and the Elsinore Fault. Some geologic references for the area also indicate the possible existence of a postulated fault (Sand Hills Fault) beneath the Algodones Sand Dunes, which may represent the inactive eastern boundary of the Salton Trough spreading center (Heath, 1992). No evidence has been documented to indicate that the Sand Hills Fault has ~~ruptured~~ been active in Holocene time. The active faults currently associated with the eastern boundary of the Salton Trough are now coincident with the East Mesa Fault and possibly the East Highline Lineament (Heath, 1992). Figure 3-4 shows that the ~~The~~ Project area itself is located in a relatively aseismic portion of Imperial County (BLM, 1993b).

Geologic relationships in the nearby Mesquite Mine indicate that northwest and northeast-trending faults which control mineralization are known to be pre-Holocene in age (greater than 10,000 years old). The Miocene-Pliocene Age (3 to 11 million year old) Bear Canyon Conglomerate has been cut by a northeast-trending system that is no younger than late Pleistocene Age (about 10,000 to 60,000 years old). Faults mapped in the Mesquite Mine pits have not ruptured the 35,000 to 40,000 year old alluvial surfaces within the Mesquite project vicinity (Tosdal, et al., 1991).

Figure 3-3: Regional Holocene Fault Map

Figure 3-4: Historic Epicenter Map

3.1.2. Mineral Resources

The Imperial Project is located midway between the historic Mesquite, Picacho, Tumco and Cargo Muchacho gold mining districts south of the Chocolate Mountains in eastern Imperial County, California (see Figure 3-5). The first gold mining in the region is attributed to early Spanish communities in the Cargo Muchacho Mountains in 1780 (Clark, 1970). Mining interest in the region increased soon after the Mexican War in 1848 and the advent of the California Gold Rush in 1849, and peaked between 1870 and 1930. Production from the mines at Picacho, Tumco, and American Girl peaked in the early 1900's, producing a cumulative total of approximately 500,000 ounces of gold. Scattered, small-scale dry wash placer operations were attempted throughout the region and many small tailings piles from these operations are still visible.

Increasing gold prices and bulk tonnage leaching technology developed in the 1970's led to exploration and subsequent development of open pits at the Picacho Mine in 1979, and the Mesquite and American Girl mines in 1980.

Little mining history exists for the Project area itself. Bedrock ~~exposed in~~ exposed in ~~sparse~~ limited locations on the north side of the Project mine and process area was first prospected by Dick and Alice Singer (Personal Communication - Steve Baumann, Chemgold, Inc., 1995). Between 1982 and 1985, Gold Fields Mining Corporation conducted a regional exploration program comprised of aeromagnetic, gravity and resistivity surveys and stream wash geochemical studies. Gravity anomalies, low-grade mineralization in exposed bedrock, and a very limited drilling program led to the discovery of minor mineralization in the fringe areas of the current Imperial Project mine and process area.

In 1987, Glamis Gold Exploration, Inc. (GGX) acquired the claims and began exploration drilling through a joint venture agreement with a third party. In 1994, GGX became the sole owner and operator of the claims and initiated an accelerated development drilling and pre-feasibility program. This program ultimately culminated in the delineation of the three (3) ore bodies designated by the proposed East Pit, Singer Pit and West Pit. Continued exploration drilling between the proposed open pits may ultimately discover additional mineral reserves.

Gold mineralization at the Project mine and process area occurs in Jurassic-age granitic gneiss in the upper plate of the Chocolate Mountains thrust (see Figure 3-1). The thrust has an estimated throw of 48 kilometers to the northeast, moving gneiss and intrusive rocks over greenschist facies schists. Analysis of drill information indicates that the deposit's geology is similar to that observed at the nearby Picacho and Mesquite gold deposits. The mineralization occurs in sub-tabular blocks

Figure 3-5: Historic Mining Districts in the Vicinity of the Imperial Project

averaging 200 to 300 feet thick and is structurally controlled by the intersection of low-angle and high-angle shear zones which are localized to the ore body (see Figure 3-2) (Personal Communication - Dan Purvance, Chemgold, Inc., 1996). Gold is associated with limonite and hematite in highly sheared and brecciated gneiss, and minor hydrothermal alteration is present as a weak form of sericitization. Oxidation extends to depths in excess of 1,500 feet below ground surface and, to date, no pyrite or other sulfide minerals have been observed in the ore or waste rock, other than oxidized remnants of pyrite in some drill cuttings.

No other mineral resources are known within the Project area.

3.2. Soil Resources

A report of the soil inventory conducted for the Project area was prepared in June, 1995 (Bamberg and Hanne, 1995a; see Attachment 2 to Appendix ~~C~~ A). The inventory report identified the various soil series mapped in the Project area, discussed the salvage potential and suitability of the soil material for reclamation activities, and contained recommendations for reclamation and revegetation activities in the area.

Most of the Project mine and process area is covered by desert pavement. The dominant mapped soil units are generally representative of relic paleosoils which formed under cool, moist conditions, not the hot, arid conditions of the current climate. A summary of the principal characteristics of the four (4) soil units identified in the Project mine and process area are presented in Table 3-1. The most notable aspects of the four (4) major types of soil are: coarse texture with large fragments; low organic matter and available nutrients; high salts and excess alkalinity; and, in some of the soils, high concentrations of other chemicals, such as boron and nitrates. Soil depths vary from as shallow as two (2) inches to generally less than 24 inches.

Table 3-1: Summary of Soil Characteristics within the Project Mine and Process Area

Taxonomic and Mapping Unit	Classification	Topographic Position	Unit Salvageable (percent)	Salvage Volume (cu.yd)	Soil Depth (in.)	Primary Salvage Limitations
A (Laprosa/Rock outcrop complex)	Exposed weathered gneiss and sandy-skeletal, mixed, lithic Haplocalcids	Low ridges, dissected	0	0	0-20	Rock outcrop, surface rubble
B	Sandy-skeletal, mixed hyperthermic, Torriopsamments	Recent alluvial fans and washes	50	16,800	0-20	Gravel texture, rock
C	Sandy-skeletal, mixed hyperthermic Torriopsamments	Shallow washes along drainages	65	26,200	18-24	Shallow, narrow extent
D	Sandy-skeletal, mixed, hyperthermic Petrocalcids	Old alluvial upland flats and slopes	3	69,200	0-24	Salt content, mixed alluvium, rock

3.3. Hydrologic Resources

3.3.1. Surface Waters

The Project area is located within the Salton Sea Drainage Basin, a closed hydrologic basin in which all surface flows drain toward the Salton Sea, a saline water body which has no outlet. However, surface water which flows from or through the Project area is prevented from reaching the Salton Sea by the Algodones Sand Dunes, a natural topographic constraint located approximately 12 miles downstream of the Project area to the southwest (see Figure 3-5). Surface flows either evaporate or infiltrate into the wash bottoms or outwash areas east of the Algodones Sand Dunes.

There are no free-standing surface waters present within the Project area or vicinity. The region's low precipitation rate, coupled with the high evaporation rate and the presence of highly permeable soils in the washes, preclude the formation of perennial or intermittent streams. The perennial water source located closest to the Project mine and process area is the Colorado River, approximately seven (7) miles northeast of the Project mine and process area at its closest point. This is outside of the Salton Sea Drainage Basin, on the other side of the Chocolate Mountains. The perennial water sources located within the Salton Sea Drainage Basin closest to the Project mine and process area are the All American Canal, approximately sixteen (16) miles south, and the Coachella Canal, a branch of the All American Canal, approximately nineteen (19) miles southwest, on the other side of the Algodones Sand Dunes. The All American Canal, which transports water from the Colorado River, is the primary source of water within the Salton Sea Drainage Basin.

3.3.1.1. Surface Flows

Surface water drainages within the Project area consist of a series of subparallel ephemeral washes which are fed by precipitation from infrequent winter storms and summer thunderstorms. Four (4) primary washes flow into the Project mine and process area. Two (2) of these washes flow together within the Project mine and process area, such that only three (3) major washes exit the Project mine and process area (see Figure 3-6). Each of these washes continue as separate channels beyond the Project mine and process area, each eventually ending in individual areas of infiltration on the eastern edge of the Algodones Sand Dunes (see Figure 3-5).

The local catchment areas for these four (4) washes were determined, and estimates of peak flow in each of the washes at the upstream boundary of the Project mine and process area calculated through use of a simple computer model

for both the Probable Maximum Precipitation (PMP) storm event and the 100-year, 24-hour storm event (WESTEC, Inc., 1994). Table 3-2 presents these catchment areas and peak flow estimates for each of the four (4) washes.

Table 3-2: Estimated Peak Runoff In Washes Through the Project Mine and Process Area

Storm Event	Precipitation (inches)	Peak Runoff (cubic feet per second)			
		Basin A	Basin C	Basin D	Basin E
Basin Area (acres)	N/A	1,870	595	890	576
PMP	5.0	4,933	1,467	2,217	1,427
100-yr, 24-hr	3.5	1,643	473	718	460

3.3.1.2. Water Quality

No direct data regarding the quality of the surface waters which occasionally flow through the Project area ~~is~~ are available. Because water flows in these washes only during infrequent storm events, and because there is no significant surface disturbance nor unusual natural sources of contaminants located upstream, the quality of the water flows are assumed to be typical of similar desert washes (i.e. very high in suspended solids and variable in dissolved solids). Based upon observations made during the "Waters Study" (see Section 3.3.1.3), the principal throughgoing stream channels appear to be currently "in balance;" that is, the reaches of the principal washes within the Project mine and process area are currently neither depositing nor eroding sediment, but simply carrying it through the Project mine and process area.

3.3.1.3. Surface Waters of the United States

The U.S. Army Corps of Engineers (USACOE), under Section 404 of the Clean Water Act, regulates the discharge of dredged or fill material into "waters of the United States" (33 U.S.C. 1251-1376). "Waters" are broadly defined at 33 CFR 328.2 to include non-tidal waters, including intermittent watercourses (commonly known as 'isolated waters') (33 CFR 328.3(a)(3)) and tributaries to such watercourses (33 CFR 328.3(a)(5)). "Isolated waters of the United States" include "All other waters such as *intrastate* lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation, or destruction of which could affect interstate or foreign commerce...", including those "which are

Figure 3-6: Principal Washes Within the Project Mine and Process Area

or would be used as habitat by birds protected by Migratory Bird Treaties; or which are or would be used as habitat by other migratory birds which cross state lines; or which are or would be used as habitat for endangered species; or used to irrigate crops sold in interstate commence" (51 FR 41217). Only vegetation which is used as habitat which is located within the "ordinary high water mark" (OHWM) of a channel, qualifies that reach of the "isolated waters" as "waters of the United States."

The limits of ACOE jurisdiction on "non-tidal waters of the United States" extends to the OHWM, in the absence of adjacent wetlands (33 CFR 328.4(c)(1)); or beyond the OHWM to the limits of the adjacent wetlands, when adjacent wetlands are present (33 CFR 328.4(c)(2)); or to the limits of the wetlands when only wetlands are present (33 CFR 328.4(c)(3)).

Surveys were performed to identify "waters of the United States," including wetlands, in and around the Project mine and process area (EMA, 1996a; see Appendix D). The surveys inventoried each of the three (3) principal throughgoing washes within the Project mine and process area, as well as all tributaries, to determine which met the criteria of "waters" and "waters of the United States" (see Figure 3-7). No wetlands were identified within the Project mine and process area. However, 52.86 acres of land within the Project mine and process area were determined to be within the OHWM of the washes, and thus were determined to be "waters." Of these 52.86 acres, only 25.31 acres were determined to qualify as "waters of the United States" because they contained vegetation which may be "used as habitat by birds protected by Migratory Bird Treaties; or which are or would be used as habitat by other migratory birds which cross state lines."

3.3.2. Ground Waters

The Project area is located within what has recently been termed the Amos-Ogilby-East Mesa ground water basin (Environmental Solutions, Inc., 1993a; WESTEC, Inc., 1996), which is roughly equivalent to the "Sand Hills Area" and "East Mesa Area" described by Dutcher, et. al. (1972). The basin is a northwesterly trending, elongated area of approximately 860 square miles within the southeastern portion of Imperial County, California, but which likely extends for hundreds of additional square miles into northern Mexico. It is bounded on the northeast by the Chocolate Mountains, on the north by the drainage divide which separates the Amos Basin from the East Salton Sea Basin, on the west by the finer sediments in the irrigated portion of the Imperial Valley, and to the south by the arbitrary political boundary with Mexico (see Figure 3-8). The alluvial sediments which make up the water-bearing aquifer range in thickness from zero (0) feet on the eastern boundary at

Figure 3-7: Waters of the United States Within the Project Mine and Process Area

Figure 3-8: Amos-Ogilby-East Mesa Ground Water Basin and Ground Water Production Wells Near the Project Area

the Chocolate Mountains to as much as 10,000 feet at the western boundary in the Imperial Valley (Environmental Solutions, Inc., 1993a).

The principal historic source of recharge to the water-bearing deposits within the Amos-Ogilby-East Mesa Basin has been reported to be leakage from the Colorado River and the All American and Coachella Canals (see Figure 3-8). An estimated 20,000 afy entered the basin from the Colorado River as underflow between the Cargo Muchacho Mountains and Pilot Knob, and the USGS (Loetz, 1975) estimated that in the late 1960's the All American and Coachella Canals contributed about 100,000 and 130,000 afy, respectively, to the ground water basin. Relatively little recharge comes from infiltration of local precipitation and runoff. Since the lining of the first 45 miles of the Coachella Canal from the All American Canal in the 1980's essentially eliminated leakage from the Coachella Canal, total recharge to the basin is roughly estimated at 100,000 afy (Environmental Solutions, Inc., 1993a). Current plans to line the All American Canal in the area of the Algodones Sand Dunes and East Mesa, which would reduce the amount of annual recharge to the basin by an estimated 67,700 afy (U.S. Bureau of Reclamation, 1994b), have been suspended (Personal Communication - ~~personal communication,~~ Michael Walker, U.S. Bureau of Reclamation, 1996).

The water in storage within the nonmarine deposits of late Tertiary and Quaternary age of the Amos-Ogilby-East Mesa Basin to a depth of 3,000 feet is estimated at approximately 230,000,000 acre-feet (Environmental Solutions, Inc., 1993a). Lower stratigraphic units found in the western portions of the Amos-Ogilby-East Mesa Basin and under the East Mesa area frequently produce geothermal waters of elevated temperature (Dutcher, et. al., 1972). Hydraulic conductivity within the basin has been reported as ranging from about 250 to 1,150 gpd/ft^2, with aquifer transmissivity reported to range from approximately 136,000 to as high as 880,000 gpd/ft (Environmental Solutions, Inc., 1993a; U.S. Bureau of Land Management, 1994b).

3.3.2.1. Ground Water Quantity

Although the principal source of recharge to the Amos-Ogilby-East Mesa Basin is reported as leakage from the Colorado River and the All American Canal, the United States Geological Survey (USGS) has recently determined that the Project area is outside of that area from which ground water production would be replaced by Colorado River water (Wilson, R.P., et al., 1994).

The area of the local catchment upgradient of the Project well field production area (ancillary area) has been estimated at approximately 30,000 acres. Since the average annual rainfall at the neighboring Gold Rock Ranch is approximately

3.60 inches (or 0.3 feet) (GSi/Water, 1993), a conservative average of 9,000 afy of precipitation falls within the catchment area. However, since nearly all of the precipitation falling within the catchment area evaporates or is consumed by plants in the vegetated portions of the basin, relatively little precipitation infiltrates and actually provides basin recharge (Environmental Solutions, Inc., 1993a). Estimates of the infiltration percentage range from one (1) to ten (10) percent, which translates to 90 to 900 afy of ground water recharge into the basin upgradient of the Project well field production area (GSi/Water, 1993).

The Project area is underlain by undifferentiated alluvial~~,~~ and lacustrine deposits of quaternary and tertiary age which rapidly thicken from the Chocolate Mountains towards the desert floor to the southwest (see Figure 3-9). The alluvium within the Project mine and process area ranges from 10 feet to as much as 1,000 feet in places (WESTEC, Inc., 1996). Ground water beneath the Project area occurs within three (3) different aquifers (see Figure 3-9 and Figure 3-10): an unconfined alluvial aquifer (the uppermost aquifer, which has a water table which is open to direct infiltration); a confined alluvial aquifer (which is bounded both above and below by relatively low permeability (impermeable) beds); and a bedrock aquifer. The alluvial aquifers consist of consolidated and unconsolidated sands and gravels. The bedrock aquifer is comprised of fractured and jointed gneissic and granitic rocks (WESTEC, Inc., 1996).

Ground water flow within the Project area is generally from the higher elevations of the Chocolate Mountains toward the alluvial basin of the valley floor, and the ground water gradient is generally from the northeast to the southwest (WESTEC, Inc., 1996). ~~One (1)~~ Two (2) ground water monitoring wells, eleven (11) piezometer holes, and one (1) ground water ~~exploration~~ production well were installed by Chemgold and its consultants in order to obtain more specific information regarding the characteristics of the alluvial and bedrock aquifers in the Project area (WESTEC, Inc., 1996, and EMA, 1996c; see Appendix E-1 and Appendix E-2 of this EIS/EIR). Figure 3-11 is a map of the locations of these holes and wells and the static ground water level (potentiometric) surface derived from these holes and wells. Table 3-3 provides the physical data (name, location, depth to ground water, and aquifer) for those holes and wells from which water quality data has been obtained.

Figure 3-9: Cross Section A-A' (Northeast-Southwest) Through the Project Area Showing Hydrologic Units

Figure 3-10: Cross Section B-B' (Northwest-Southeast) Through the Project Area Showing Hydrologic Units

Figure 3-11: Location Map of Imperial Project Area Ground Water Holes and Wells and Ground Water Potentiometric Map

Table 3-3: Summary of Physical Data From Selected Piezometer Holes, Monitoring Wells, and Production Wells

HOLE NUMBER	LOCATION	TOTAL DEPTH (ft bgs)	DEPTH TO STATIC WATER (ft bgs)	AQUIFER
Piezometer Holes				
94H-1	Mine and Process Area	1,000	657.2	Alluvial (unconfined)
EC-5	Mine and Process Area	800	720	Bedrock
WC-5	Mine and Process Area	800	606	Bedrock
WR-2	Mine and Process Area	945	694.5	Alluvial (unconfined)
Monitoring Wells				
MW-1	Mine and Process Area	640	479.7	Conglomerate (confined)
MW-2	Mine and Process Area	880	657.2	Bedrock
Production Wells				
PW-1	Water Supply Area	960	544.4	Alluvial (confined)

Static ground water elevations in the wells completed in the alluvial aquifers ranged from a high of 360 feet AMSL immediately northeast of the Project mine and process area to a low of 70.5 feet AMSL in the southwest corner of the Project mine and process area, which produces a gradient from northeast to southwest. Variations in measured static water levels ~~within the alluvial aquifers~~ were attributed to the wells being completed in the ~~two (2)~~ different aquifers (WESTEC,~~,~~ Inc., 1996; EMA, 1996c).

Static ground water elevations in the bedrock aquifer ranged from a high of 211 feet AMSL in the area of the proposed West Pit to a low of 85.5 feet AMSL approximately two (2) miles southwest of the Project mine and process area. With the exception of the elevation in the West Pit, all of the bedrock aquifer measurements produced an essentially flat surface; the anomalously high West Pit bedrock aquifer elevation was attributed to either the fracture-controlled nature of the aquifer or an unknown ground water barrier between the two (2) proposed pits (WESTEC, Inc., 1996).

Preliminary testing of the confined alluvial aquifer from a piezometric hole located adjacent to the ground water exploration well (approximately 4.5 miles southwest of the Project mine and process facilities) indicated a hydraulic conductivity of ~~9.2~~ 1.85 x 10^{-4} ft/sec (WESTEC, Inc., 1996; see Appendix E-1 of

this EIS/EIR). Transmissivity values for this same alluvial aquifer, calculated from the 48-hour constant rate pumping and recovery test of the ground water exploration well, were calculated to range from approximately 7,200 gpd/ft to 42,508 gpd/ft. Preliminary slug and falling head tests of the piezometers completed in the bedrock aquifer showed very low hydraulic conductivities, on the order of 10^{-8} ft/sec (WESTEC, Inc., 1996).

There is currently no ground water being produced from beneath the Project area. Limited pumping of ground water occurs from the Amos-Ogilby-East Mesa Basin in the immediate vicinity of the Project area, this from: a well located at Gold Rock Ranch (approximately four and one-half (4.5) miles southwest of the Project production well field area); two (2) wells located at the American Girl Mine (approximately eight (8) miles south of the Project production area); and three (3) production wells located at the Mesquite Mine area (approximately eight (8) miles west-northwest of the Project production area) (see Figure 3-8). The produced ground water is authorized for mining and domestic uses. The well at the Gold Rock Ranch is used to supply domestic water for the ranch. Current usage is estimated at 5,000 gpd (less than six (6) afy), with an estimated historic maximum usage rate of 12,000 gpd (less than fourteen (14) afy), as estimated by the owner (U.S. Bureau of Land Management, 1994b). Ground water usage for the American Girl Mine operations was reported as less than 200 afy (U.S. Bureau of Land Management, 1994b). The rate of production of water from the Mesquite Mine wells was reported at approximately 1,500 afy (Environmental Solutions, Inc. 1993a).

3.3.2.2. Ground Water Quality

Ground water quality within the Amos-Ogilby-East Mesa Basin consistently shows levels of ~~specific conductance,~~ total dissolved solids (TDS), chloride, and fluoride which exceed drinking water standards (Environmental Solutions, Inc., 1993a). TDS concentrations range from 1,100 mg/l in the Mesquite Mine wells to greater than 3,000 mg/l in the Glamis and Boardman wells (WESTEC, Inc., 1996). In general, the ground water is not suitable as drinking water without prior treatment, although the quality is sufficient for use in mining operations.

~~Ground water samples collected and analyzed from the Project ground water monitoring well, the piezometer holes, and the ground water exploration well show TDS levels at the low end of the range for wells completed within the basin, from 600 to 1,500 mg/l, and the water quality appears to be suitable for non-potable uses (WESTEC, Inc., 1996). The ground water exploration well, which probably represents the best sample of ground water quality for the Project area, had a TDS of only 906 mg/l. Iron, aluminum, and manganese~~

~~concentrations in a number of the piezometer hole ground water samples exceeded secondary drinking water standards, although these elevated metal concentrations may be due to the use of drilling fluids during the well drilling operations (WESTEC, Inc., 1996). The fluoride concentration in the ground water exploration well was 1.6 mg/l, which slightly exceeded the California maximum contaminant concentration of 1.4 mg/l, but all other trace element concentrations were below applicable water quality standards (WESTEC, Inc., 1996).~~

Table 3-4 provides water quality data for the Project ground water monitoring and production wells. Filtered samples from the upgradient monitoring well (MW-1) met all primary drinking water standards, but exceeded the secondary drinking water standards for TDS and manganese. The downgradient monitoring well (MW-2) met all primary drinking water standards except for arsenic, and exceeded secondary drinking water standards for chloride, manganese, sulfate, and TDS. The production well (PW-1) met all primary drinking water standards except for fluoride, and exceeded secondary drinking water standards for chloride, iron, and TDS. TDS levels were at the lower end of the range for wells completed within the basin, and the water quality appears to be suitable for non-potable uses (WESTEC, Inc., 1996) [see Appendix E-1]. Stiff and Piper diagrams (see Figure 2-3 in Appendix E-2) indicate that the dominant cation species are sodium and potassium, while the dominant anion varies from sulfate and carbonate/bicarbonate near the Project mine and process area to chloride and sulfate in the alluvial basin.

Table 3-4: Water Quality Data from Project Monitoring and Production Wells

Element	Units	Current Drinking Water Quality Standards	Well Number										
			MW-1	MW-1	MW-1	MW-1	MW-1 A	MW-1 B	MW-2	MW-2	MW-2 A	MW-2 B	PW-1
Collection Date			08/30/95	11/28/95	04/22/96	08/15/96	08/29/96	08/29/96	07/11/96	08/15/96	08/29/96	08/29/96	11/19/95
Field Filtering			unfiltered	unfiltered	unfiltered	unfiltered	filtered	unfiltered	unfiltered	unfiltered	filtered	unfiltered	filtered
Alkalinity	mg/l		138	183	183	171	163	186	246	169	95	195	32
Aluminum	mg/l	1.0 (1) 0.02 (2)	0.5	1.7	<0.1	0.3	<0.02	1.37	0.7	1.3	<0.02	4.03	<0.1
Antimony	mg/l	0.006 (1)	<0.5	<0.5	<0.04	<0.003	<0.005	<0.005	<0.003	<0.003	<0.005	<0.005	<0.002
Arsenic	mg/l	0.05 (1)	<0.005	0.005	0.02	<0.005	<0.01	0.01	<0.005	<0.005	0.09	0.11	0.009
Barium	mg/l	1.0 (1)	0.2	<0.1	0.2	<0.1	0.17	0.21	0.1	0.1	0.04	0.08	<0.1
Beryllium	mg/l	0.004 (1)	<0.1	<0.1	<0.002	<0.002	<0.001	0.001	<0.002	<0.002	<0.001	0.002	<0.0002
Bismuth	mg/l		<0.1	<0.1	<0.1	<0.1	<1	<1	<0.1	<0.1	<1	<1	<0.1
Boron	mg/l						0.50	0.53			4.95	5.06	
Cadmium	mg/l	0.005 (1)	0.0004	0.0006	<0.0002	<0.002	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.0002
Calcium	mg/l		83	38	53	34	49.4	57.1	64	80	67.3	108	57
Chloride	mg/l	250 (2)	92	110	91	39	56.1	61.1	130	120	641	606	320
Chromium	mg/l	0.05 (1)	<0.1	<0.1	<0.1	<0.1	<0.01	0.03	<0.1	<0.1	<0.01	0.07	<0.1
Cobalt	mg/l		<0.1	<0.1	<0.1	<0.1	<0.03	<0.03	<0.1	<0.1	<0.03	<0.03	<0.1
Field Conductance	μmhos/cm						832	832			2460	2460	
Copper	mg/l	1.0 (2)	<0.1	<0.1	<0.1	<0.1	<0.01	<0.01	<0.1	<0.1	<0.01	0.03	<0.1
Fluoride	mg/l	1.4 (1)	0.2	0.5	0.2	0.3	0.6	0.6	0.2	0.2	0.6	0.6	1.6
Gallium	mg/l		<0.1	<0.1	<0.1	<0.1	<0.5	<0.5	<0.1	<0.1	<0.5	<0.5	<0.1
Iron	mg/l	0.3 (2)	1.4	3.4	<0.1	0.2	<0.03	4.39	0.5	1.7	<0.03	6.64	0.4
Lead	mg/l		0.009	0.015	<0.002	<0.005	<0.003	0.049	<0.003	<0.005	<0.003	0.024	<0.002
Lithium	mg/l		<0.1	<0.1	<0.1	<0.1	0.04	0.06	<0.1	<0.1	0.58	0.67	0.1
Magnesium	mg/l		31	6	6.7	3.4	5.3	5.7	28	31	19.0	27.5	1.5
Manganese	mg/l	0.05 (2)	<0.1	0.3	0.1	<0.1	0.70	1.10	<0.1	0.20	0.09	0.50	<0.1

Element	Units	Current Drinking Water Quality Standards	Well Number										
			MW-1	MW-1	MW-1	MW-1	MW-1 A	MW-1 B	MW-2	MW-2	MW-2 A	MW-2 B	PW-1
Mercury	mg/l	0.002 (1)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005
Molybdenum	mg/l		<0.5	<0.5	<0.1	<0.1	<0.05	<0.05	<0.1	<0.1	0.12	0.06	<0.5
Nickel	mg/l	0.1 (1)	<0.1	<0.1	<0.1	<0.1	<0.04	0.04	<0.1	<0.1	<0.04	0.08	<0.1
Nitrate Nitrogen	mg/l	10 (1)	0.1	0.6	<0.1	<0.1	0.13	0.05	0.2	0.3	0.07	<0.05	1.9
pH	mg/l	6.8 - 8.5	7.99	7.6	7.47	7.29	7.69	7.51	7.79	7.49	7.70	7.64	8.2
Phosphorous	mg/l		<0.1	0.3	<0.1	<0.1	0.09	0.31	<0.1	<0.1	0.03	0.80	<0.1
Potassium	mg/l		6	6.9	4.7	4.1	6	10	8.6	5.9	10	20	0.1
Scandium	mg/l		<0.1	<0.1	<0.1	<0.1	<0.01	<0.01	<0.1	<0.1	<0.01	<0.01	<0.1
Selenium	mg/l	0.05 (1)	<0.001	<0.001	<0.001	<0.001	<0.01	<0.01	<0.001	0.001	<0.01	<0.01	<0.001
Silver	mg/l	0.1 (2)	<0.0005	<0.0005	<0.0005	<0.002	<0.01	<0.01	<0.002	<0.002	<0.01	<0.01	<0.0005
Sodium	mg/l		130	200	160	150	159	135	140	150	537	463	260
Strontium	mg/l		1.8	1.2	4.5	0.3	4.28	4.19	1.3	1.3	2.57	2.61	0.8
Sulfate	mg/l	250 (2)	290	200	210	160	230	211	320	270	360	230	180
TDS	mg/l	500 (2)	799	712	656	529	620	640	728	804	1780	1690	906
Thallium	mg/l	0.002 (1)	<1	<1	<0.0005	<0.001	<0.002	<0.005	<0.001	<0.001	<0.002	<0.005	0.001
Tin	mg/l		<1	<1	<1	<0.5	<0.05	<0.05	<1	<0.5	<0.05	<0.05	<1
Titanium	mg/l		<0.1	<0.1	<0.1	<0.1	<0.01	<0.01	<0.1	0.1	<0.01	0.01	<0.1
Vanadium	mg/l		<0.1	<0.1	<0.1	<0.1	<0.05	<0.05	<0.1	<0.1	<0.05	<0.05	<0.1
Zinc	mg/l	5.0 (2)	0.3	0.9	<0.1	<0.1	<0.01	0.06	<0.1	0.1	<0.01	0.26	<0.1

(1) California Primary Maximum Contaminant Limit
(2) California Secondary Maximum Contaminant Limit

3.4. Air Resources

3.4.1. Regulatory Framework

Ambient air quality and the emission of air pollutants are regulated under both federal and California laws and regulations. In addition, there are local requirements and standards which provide regulation of both air quality and the emission of air pollutants in the Project area.

The federal Clean Air Act (CAA), and the subsequent Clean Air Act Amendments (CAAA), required the ~~U.S. Environmental Protection Agency (~~ USEPA~~)~~ to identify national ambient air quality standards (NAAQS) to protect public health and welfare. NAAQS have been established for six (6) pollutants, known as "criteria" pollutants because the standards satisfy "criteria" specified in the CAA. A list of the criteria pollutants regulated by the CAA, and the standards set by the USEPA for each, are listed in Table 3-5.

The California Air Resources Board (CARB), which is part of the California Environmental Protection Agency (Cal-EPA), is the California state agency with responsibility for establishing California Ambient Air Quality Standards (CAAQS) under the California Clean Air Act (CCAA). The CAAQS are generally more stringent than the NAAQS. A list of the California "criteria" air pollutants, and the CAAQS adopted for each, are also included in Table 3-5.

Pursuant to the CAA, the USEPA has developed classifications for distinct geographic regions known as air basins. Under these classifications, for each federal criteria pollutant, each air basin (or portion of an air basin) is classified as in "attainment," if the air basin has "attained" compliance with (that is, not exceeded) the adopted NAAQS for that pollutant, or is classified as "non-attainment" if the levels of ambient air pollution exceed the NAAQS for that pollutant. Air basins which have not received sufficient analysis for certain criteria pollutants are designated as "unclassified" for those particular pollutants. Air basins located within California receive similar designations with respect to the CAAQS.

3.4.2. Meteorological Setting

The Project area is a desert environment characterized by very hot summers and mild winters. Humidity in the area is very low, with the exception being July and August, when humid winds may blow in from the Gulf of California, located southeast of the Project area (U.S. Bureau of Land Management, 1994a). Precipitation in the area is low, with the average annual rainfall measured at the

neighboring Gold Rock Ranch being only approximately 3.60 inches per year (GSi/Water, 1993).

Table 3-5: Federal and State Ambient Air Quality Standards for Criteria Pollutants

Criteria Pollutant	Averaging Period	California Standards Concentration[a]	Federal Standards Primary[a]	Federal Standards Secondary[a]
Ozone (O_3)	1-Hour	90 ppbv (180 $\mu g/m^3$)	120 ppbv (235 $\mu g/m^3$)	Same as Primary Standards
Carbon Monoxide (CO)	8-Hour	9 ppmv (10 mg/m^3)	9 ppmv (10 mg/m^3)	-
	1-Hour	20 ppmv (23 mg/m^3)	35 ppmv (40 mg/m^3)	
Oxides of Nitrogen (NO_x) as Nitrogen Dioxide (NO_2)	Annual	-	53 ppbv (100 $\mu g/m^3$)	Same as Primary Standards
	1-Hour	250 ppbv (470 $\mu g/m^3$)	-	
Sulfur Dioxide (SO_2)	Annual	-	30 ppbv (80 $\mu g/m^3$)	-
	24-Hour	40 ppbv (105 $\mu g/m^3$)	140 ppbv (365 $\mu g/m^3$)	-
	3-Hour	-	-	500 ppbv (1,300 $\mu g/m^3$)
	1-Hour	250 ppbv (655 $\mu g/m^3$)	-	-
Particulate Matter ≤ 10 Microns in Diameter (PM_{10})	Annual Geometric Mean	30 $\mu g/m^3$	-	-
	24-Hour	50 $\mu g/m^3$	150$\mu g/m^3$	Same as Primary Standards
	Annual Arithmetic Mean	-	50 $\mu g/m^3$	
Sulfates (SO_4)	24-Hour	25 $\mu g/m^3$	-	-
Lead (Pb)	30-Day	1.5 $\mu g/m^3$	-	-
	Calendar Quarter	-	1.5 $\mu g/m^3$	Same as Primary Standards
Hydrogen Sulfide (H_2S)	1-Hour	30 ppbv (42 $\mu g/m^3$)	-	-

[a] Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 mm mercury. Measurements of air quality are corrected to a reference temperature of 25°C and a reference pressure of 760 mm mercury (~~1.013.2~~ 1,013.2 millibar); ppmv and ppbv in this table refer to ppm and ppb by volume, respectively, or micro-moles of pollutant per mole of gas. $\mu g/m^3$ ≡ micrograms per cubic meter (CARB, 1994).

Two (2) general wind patterns exist in the region (U.S. Bureau of Land Management, 1994a). From October to May, the prevailing winds are out of the west and northwest, and it is during these periods that humidity is at its lowest. Summer wind patterns, especially during July and August, are dominated by heat-induced low-pressure areas formed over the California desert, which draw air from the Gulf of California and the northern portion of Mexico. During these conditions, humidity is at its highest. The months of June and September are transitional months. Wind speeds in the region tend to be moderate, ranging from 5 to 8 mph at night (weakest in the late spring and strongest in the winter) to daytime winds averaging between 9 and 13 mph (strongest in the winter and early spring, weakest in the fall). These wind speeds tend to promote mixing, and generally transport locally generated air emissions away from the area (U.S. Bureau of Land Management, 1994a).

3.4.3. Air Quality

The Project area is located within the Imperial County portion of the Southeast Desert Air Basin (SEDAB). The Imperial County portion of the SEDAB is entirely under the jurisdiction of the Imperial County Air Pollution Control District (ICAPCD). That portion of Imperial County west of the crest of the Chocolate Mountains, which includes the Project area, is designated as "non-attainment" under both the NAAQS and CAAQS for particulate matter less than 10 microns in diameter (PM_{10}) (Pechan & Associates, 1993). All of Imperial County is designated "non-attainment" for ozone (O_3) under the CAAQS, and is designated as "attainment" for sulfates/sulfur dioxide (SO_4/SO_2) and oxides of nitrogen (NO_x), and "unclassified" for carbon monoxide (CO), under the NAAQS and CAAQS, as applicable (U.S. Bureau of Land Management, 1994a).

The ICAPCD-run stations for monitoring atmospheric pollutants located in California nearest the Project area are in El Centro and Brawley, California, approximately 46 miles west-southwest and 42 miles west, respectively, of the Project mine and process area. Both O_3 and PM_{10} are measured at the El Centro station, whereas only PM_{10} is measured at the Brawley station. In addition, since 1985 PM_{10} has been measured at four (4) stations located adjacent to, and operated by the operators of, the Mesquite Mine, which is located approximately ten (10) miles northwest of the Project mine and process area.

The Imperial Valley is classified as "non-attainment" for PM_{10} by both the USEPA and CARB. During the 1988-1993 period, daily averages for PM_{10} measured at Brawley exceeded the CAAQS a total of 141 days (CARB, 1989-1994). The highest number of exceedance days (35) in a single year was recorded in 1989, with 676 $\mu g/m^3$ being the highest recorded 24-hour PM_{10} concentration. Similarly, daily averages for PM_{10} measured at El Centro during the same period exceeded the CAAQS a total of 122 days. The highest number of exceedance days (31) in a single year was also recorded in 1989, with 287 $\mu g/m^3$ being the highest recorded 24-hour PM_{10} concentration (U.S. Bureau of Land Management, 1994a). No data is currently available regarding the existing ambient PM_{10} concentrations in or immediately adjacent to the Project area, although monitoring at the Mesquite Mine during 1991 indicated that the 24-hour CAAQS for PM_{10} was likely exceeded a total of 27 days that year (U.S. Bureau of Land Management, 1994a). Background PM_{10} levels calculated from the PM_{10} measured at the Mesquite Mine during 1991 and 1992 are reported as 19.9- $\mu g/m^3$ (U.S. Bureau of Land Management, 1994a). The federal NAAQS was never exceeded at the Mesquite Mine during that year, although measurements taken at Brawley and El Centro did exceed the NAAQS (U.S. Bureau of Land Management, 1994a).

Sources of PM_{10} in Imperial County are both natural and anthropogenic (related to the activities of man). The primary source of PM_{10} and the related pollutant, Total Suspended Particulates (TSP), in Imperial County is fugitive dust from area sources, principally vehicular traffic on unpaved roads and wind erosion of cultivated agricultural land, although PM_{10} and TSP transported into the Imperial Valley from Mexico ~~is~~ are also substantial (Pechan & Associates, 1993). PM_{10} can also be created indirectly in the atmosphere from chemical reactions that convert gaseous precursors into small particles. These PM_{10} precursors, which are predominantly products of man-made combustion, include NO_x, reactive organic gases (ROGs), and oxides of sulfur (SO_x). Principal existing PM_{10}/TSP sources in the vicinity of the Project area are wind erosion from disturbed areas, vehicular traffic on unpaved roads, and fugitive and point source emissions from nearby mining operations.

Ozone (O_3) is a photochemical oxidant which is not typically emitted directly into the atmosphere, but is formed in the atmosphere through chemical reactions among emission precursors and ultraviolet light. Imperial County is classified as "attainment" by the USEPA for O_3 since recent ambient air monitoring for O_3 at the El Centro station has not indicated any exceedances of the federal NAAQS for O_3. However, between 1988 and 1993 there were a total of 45 exceedance days (139 hours) of the lower CAAQS for O_3 (CARB, 1989-1994). The highest number of exceedance days (25) in a single year was recorded in 1993, with 150 ppbv being the highest recorded 24-hour O_3 concentration. A substantial portion of the O_3 measured in Imperial County is believed to be transported into the basin from other areas, principally from the South Coast Air Basin (SOCAB)~~,~~ and Mexico, and these sources are likely the cause of at least some of the measured exceedances of the O_3 CAAQS (U.S. Bureau of Land Management et.al., 1994a).

Hydrocarbons, or more specifically ROGs (also known as reactive organic compounds (ROCs)), are not strictly criteria air pollutants, but are recognized as precursors of photochemical oxidants, including O_3, and are also precursors to atmospheric particulate matter, both of which are criteria air pollutants. In addition, oxides of nitrogen (NO_x) and oxides of sulfur (SO_x), some forms of which are criteria pollutants, are also precursors to photochemical oxidants and atmospheric particulate matter. Table 3-6 presents a list of the criteria pollutants which can be created by secondary reactions from emissions of the precursors ROGs (ROCs), NO_x, and SO_x.

Table 3-6: Secondary Criteria Pollutants from Emissions of ROG, NO_x, and SO_x.

Precursor	Secondary (Criteria) Pollutants
Reactive Organic Gases (ROGs)	a) photochemical oxidants (ozone)
	b) the organic fraction of suspended particulate matter
Oxides of Nitrogen (NO_x)	a) nitrogen dioxide (NO_2)
	b) the nitrate fraction of suspended particulate matter
	c) photochemical oxidants (ozone)
Oxides of Sulfur (SO_x)	a) sulfur dioxide (SO_2)
	b) sulfate (SO_4)
	c) the sulfate fraction of suspended particulate matter

Source: SCAQMD, 1994.

Principal sources of ROGs in the atmosphere include vehicular and industrial emissions and unsaturated hydrocarbon emissions from trees and other vegetation. No data is currently available regarding the levels of hydrocarbons in the ambient air in the Project area or immediate vicinity, but they are presumed to be negligible due to the lack of significant emissions sources, including nearby existing mining operations (which typically have few sources of ROGs except for internal combustion engines). Similarly, no data is available regarding existing levels of sulfur dioxide (SO_2) and nitrogen dioxide (NO_2) in the ambient air in the immediate Project area, although the levels of these pollutants are also presumed to be small because of the absence of local sources.

In addition to the NAAQS, the CAA has also requires the designation of airsheds within the United States into one (1) of three (3) classes, which are designed to prevent the deterioration of air quality below the NAAQS. Class I is the most restrictive air quality category, and was created by Congress to prevent further deterioration of air quality in national parks and wilderness areas of a given size which were in existence prior to 1977 or have since been designated under federal regulations (40 CFR 52.21). All remaining areas outside of the Class I area boundaries were designated as Class II airsheds, which allows a relatively greater deterioration of air quality over that in existence in 1977, although still below NAAQS. No Class III areas, which would allow air quality to degrade down to the NAAQS, have been designated.

Federal Prevention of Significant Deterioration (PSD) regulations require that the maximum allowable increase in ambient particulate matter ~~(TSP)~~ in a Class I airshed resulting from a major stationary source is 5 $\mu g/m^3$ (annual geometric mean) and

10 $\mu g/m^3$ (24-hour average). Specific types of facilities which emit, or have the potential to emit, 100 tons per year or more of PM_{10}, or any facility which emits, or has the potential to emit, 250 tons per year or more of PM_{10}, is considered a major stationary source. However, most fugitive emissions are <u>not</u> counted as part of the calculation of emissions for PSD. There are no Class I airsheds within 100 kilometers of the proposed Project area (U.S. Bureau of Land Management et.al, 1994a).

3.5. Biological Resources

3.5.1. Regulatory Framework

3.5.1.1. Federal Endangered Species Protection

The federal Endangered Species Act of 1973, as amended (ESA), provides the general regulatory framework for the protection of threatened or endangered (T/E) plant and animal species and critical habitat which are formally listed under the ESA. The ESA defines the following terms:

- <u>Endangered species</u>: "... any species which is in danger of extinction throughout all or a significant portion of its range ..."
- <u>Threatened species</u>: "... any species which is likely to become an endangered species within the foreseeable future..."
- <u>Critical habitat</u>: "... the specific areas within the geographical area occupied by the species ... on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection ..."

The ESA is administered by the U.S. Fish and Wildlife Service (USFWS), in consultation with other federal agencies (see Section 3.5.2).

In addition to listed T/E species, the USFWS identifies another group of species known as special status species (formerly candidate species). Special status species are not specifically afforded the same protection under the ESA as T/E species, but federal agencies are required to consider special status species in their planning and decision-making processes. The BLM evaluates special status species in a manner analogous to T/E species, and the BLM is required to deny approval of any project that may lead to the listing of special status species~~*{Nancy Nicolai: can you provide EMA with a citation for this requirement?}*~~.

3.5.1.2. California Endangered Species Protection

The California Endangered Species Act of 1984 (CESA) and the California Native Plant Protection Act of 1977 (CNPPA) provide the framework for protection of California listed rare or endangered plant or animal species. The state also affords protection to candidate species which have been accepted for state review for potential listing as rare, threatened or endangered species. CESA status definitions include:

- Endangered: A native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant which is in serious danger of becoming extinct throughout all, or a significant portion, of its range due to one or more causes, including loss of habitat, change of habitat, overexploitation, predation, competition, or disease.

- Threatened: A native species or subspecies of a bird, mammal, fish, amphibian, reptile or plant that, although not presently threatened with extinction, is likely to become an endangered species in the foreseeable future in the absence of the special protection and management efforts required by this chapter (Fish and Game Code Chapter 1.5).

- Rare: A species, subspecies or variety is rare when, although not presently threatened with extinction, it is in such small numbers throughout its range that it may become endangered if its present environment worsens.

- Candidate: A native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant that the Fish and Game Commission (Commission) has formally noticed as being under review by the California Department of Fish and Game (CDFG) for addition to either the list of endangered species or the list of threatened species, or a species for which the Commission has published a notice of proposed regulation to add the species to either list.

- Species of Special Concern: Native species or subspecies that have become vulnerable to extinction because of declining population levels, limited ranges, or rarity. The goal is to prevent these species from becoming endangered by addressing the issues of concern early enough to secure long term viability for these species.

The CEQA process requires lead agencies to consult with the CDFG if proposed projects will adversely impact T/E species or their critical habitat (see Section 3.5.3).

3.5.1.3. BLM Sensitive Species

Plant and animal species are listed by the BLM as sensitive species if the species has been identified as a proposed T/E species or a special status species by the USFWS, or if the species has been designated as sensitive by the BLM State Director from information obtained from the California Native Plant Society (CNPS), California Natural Diversity Data Base (CNDDB), or other authoritative sources. The purpose of this listing it to provide increased management attention to species which may subsequently be listed as a federal or state T/E species as a result of declining populations or habitat.

3.5.1.4. California Native Plant Society

The CNPS is a professional society of plant biologists, scientists, and associated professionals which has accumulated a statewide data base on California native plants and their distribution. The CNPS has created four categorical listings of plants to identify their respective concern for these species as potential rare, threatened, or endangered species. These listings do not afford legal status or protection for the species, but the lists are utilized by agencies in their planning processes for activities which may impact the species or habitat. The listing categories include:

- <u>CNPS 1A</u>: Plant species presumed to be extinct in California.
- <u>CNPS 1B</u>: Plant species presumed to be rare, threatened, or endangered in California or elsewhere.
- <u>CNPS 2</u>: Plant species presumed to be rare, threatened, or endangered in California but common elsewhere.
- <u>CNPS 3</u>: Plant species for which more information is needed to be properly categorized, and includes an assemblage of taxa that have been transferred from other lists or have been suggested to CNPS for consideration.
- <u>CNPS 4</u>: Plant species which are not currently threatened or vulnerable but are considered to have limited distribution in California and, because of their uncommon status, should be monitored.

3.5.1.5. California Natural Diversity Data Base

The CNDDB is a computerized inventory of information on the general location and condition of California's rare and threatened animals, plants, and natural communities maintained by the CDFG. The species inventoried by the CNDDB are listed (both state and federal) endangered, threatened, and rare animals and plants. The CNDDB also includes species that the scientific community considers deserving of official listing. Sensitive species proposed for federal listing, USFWS special status species (formerly candidate species), and state candidate species are also identified by the CNDDB. The CNDDB includes information for reported sightings only, and it may not cover every project location. Therefore, site-specific biological surveys are typically required.

3.5.1.6. Migratory Bird Treaty Act

Provisions of the Migratory Bird Treaty Act (16 USC 701-718h) are applicable to birds within the Project area. The Act makes no provisions for the killing of any migratory birds without a permit. Any activity, including mining operations or cyanide heap leaching processes, which repeatedly or negligently fails to prevent migratory bird mortality, could be prosecuted under the Act. With the exception of three (3) bird species: (a) English sparrow (*Passer domesticus*); (b) starlings (*Sturnus vulgaris*); and (c) barnyard pigeons (*Columba livia*), all birds are considered migratory under the Act. Raptors and many other birds are protected from hunting under the Act.

3.5.1.7. Bald Eagle Protection Act

The golden eagle (*Aquila chrysaetos*) is not listed under the federal ESA as a threatened or endangered species, but the golden eagle is a fully protected species in California. In addition, amendments to the Bald Eagle Protection Act (PL 92-535) provide additional federal protection to the golden eagle.

3.5.2. U.S. Fish and Wildlife Service Consultation

The ESA requires that the USFWS be formally consulted by federal agencies for those actions proposed by the federal agency which may adversely affect listed T/E species or their critical habitats. Protection under the ESA also extends to species and habitat proposed for listing, and the BLM extends protective status to species and habitat identified by the USFWS as candidates for listing. The ESA prohibits the "take" (i.e., killing, harming, or harassment) of listed T/E species without special exemptions. Section 7(a) of the ESA requires that federal agencies responsible for authorizing projects (authorizing agencies) which may adversely affect a listed

species, or may adversely modify listed critical habitat designated for such a species, undertake consultation with the USFWS. As discussed below, consultation may be informal or formal.

Informal consultation is a process that includes all discussions and correspondence between the authorizing agency and USFWS and is designed to determine if formal consultation is required. Unless it is readily apparent that formal consultation is necessary, the authorizing agency will typically first consult informally on all actions that may affect a listed species or its listed critical habitat. The authorizing agency will also typically seek recommendations for modification of actions that will avoid the likelihood of adverse effects and contribute to achieving recovery objectives for the listed species or its critical habitat.

Formal consultation is initiated by the authorizing agency through the preparation, and submittal to the USFWS, of a Biological Assessment prepared by the authorizing agency for the "proposed action." This Biological Assessment would be utilized in association with other informational resources by the USFWS to prepare the Biological Opinion. The Biological Opinion will determine if the "proposed action" is likely to jeopardize the continued existence of a listed species. A section of the Biological Opinion would specify the terms and conditions under which the listed species may be taken. This section also determines appropriate levels of take, as defined by individuals of the species killed, injured, or moved, and the amount of critical habitat subject to temporary and/or permanent disturbance. If the USFWS' Biological Opinion determines that the "proposed action" may jeopardize the continued existence of a listed species, then the authorizing agency must notify the USFWS in writing prior to its final decision on the "proposed action."

The consultation process is terminated by: (a) the issuance of a biological opinion by the USFWS; (b) notification by the authorizing agency that the "proposed action" is not likely to occur; or (c) a determination by the authorizing agency (with the concurrence of the USFWS) that the "proposed action" is not likely to adversely affect any listed species.

3.5.3. California Department of Fish and Game Consultation

3.5.3.1. State Listed Species

The CESA also prohibits the "take" of any state listed species. The CEQA lead agency is required to consult with the CDFG to determine if proposed projects are likely to jeopardize the continued existence of any T/E species or result in the destruction or adverse modification of habitat essential to the continued existence of any T/E species (Fish and Game Code § 2081). The

CDFG ~~may authorize~~ has historically authorized exceptions to individuals which would allow the "take" of state listed species for management purposes under Section 2081 of the California Fish and Game Code. Where applicable, the Section 2081 process establishes measures for the protection of the affected T/E species and ~~its~~ their habitat during project actions. Where a species is both federal and state listed, and a project is subject to both NEPA and CEQA, the CDFG is encouraged to participate to the extent practical in the federal consultation and adopt a coordinated biological opinion with the USFWS that reflects consistent and compatible findings between state and federal agencies.

Fourteen (14) animal and three (3) plant state-listed species have been identified by the CDFG within Imperial County (CDFG, 1995). Project impacts on each of these species and their habitat must be considered by the CDFG under Section 2081.

3.5.3.2. Stream Alteration Agreement

Entities which propose to divert, obstruct or change the natural flow or the bed, channel or bank of any river, stream or lake in which there is at any time an existing fish or wildlife resource, must first notify the CDFG prior to the activity (Fish and Game Code § 1603). When an existing fish or wildlife resource may be "substantially adversely affected by the project or activity," the CDFG must respond to the notice by providing a description of the resource which would be affected and submitting a proposal for measures necessary to protect fish and wildlife. The affected entity is provided an opportunity to accept the CDFG proposal or through consultation reach a mutual agreement on measures necessary to protect fish and wildlife (i.e., Stream Alteration Agreement). If no agreement can be reached, then a panel of arbitrators is established with the power to settle disagreements and make binding decisions regarding fish and wildlife modifications. The project or activity may not proceed unless it is conducted in conformance with a Stream Alteration Agreement or the decisions of the panel of arbitrators.

A Stream Alteration Agreement would be required to conduct Project activities within the ephemeral drainage channels within the Project mine and process area. Of concern would be the effects of the Project on the wildlife and wash habitat.

3.5.4. Biological Setting

3.5.4.1. Project Location

The Project area is located in an Eastern Colorado Desert environment in southeastern Imperial County. The Project mine and process area is located on a broad south and west facing alluvial plain southwest of Indian Pass, between the Cargo Muchacho Mountains (approximately four (4) miles south) and Peter Kane Mountain (approximately six (6) miles north). The elevation over the Project mine and process area ranges from about 760 feet to 925 feet AMSL with the lower, and nearly flat, elevations in the south and southwest. Elevations gradually increase to the north and northeast with topography characterized by a series of gently rolling ridges separated by interconnecting drainages generally trending from northeast to southwest.

Soils within the Project area are dominated by desert pavement in the upland areas with gravel-based alluvial soil in the major drainages and the west-central portion of the Project mine and process area (see Section 3.2). Soils of the upland landscape support very little vegetation. A soil resource evaluation of the Project mine and process area was conducted by Bamberg and Hanne (August 1995a) and is provided as Attachment D to Appendix ~~F to~~ A of this report.

There are no springs, seeps, permanently wet areas, wetlands, nor standing surface water within the Project area. Three (3) primary, sub-parallel, ephemeral stream channels traverse the Project mine and process area (see Section 3.3.1). The largest ephemeral stream channel is located near the western boundary of the Project mine and process area and parallels Indian Pass Road (see Section 3.3.1.1 and Figure 3-6). Two (2) branches of a second ephemeral channel enter the north-central portion of the Project mine and process area, merge, and exit the south-central portion of the Project mine and process area as a single ephemeral stream channel. The third ephemeral steam channel is located in the east portion of the Project mine and process area. Precipitation in the Colorado Desert tends to occur in short, intense events and average annual precipitation in the Project area is approximately 3.6 inches (see Section 3.4.2). The infrequent rain events result in temporary flow in the channels across the ~~site~~ Project area which quickly infiltrates in the sandy and gravelly wash bottoms providing some residual moisture to the wash vegetation between storm events.

Fluvial processes in the washes affect the rate of deposition and type of material deposited on the wash bottoms. Fluvial processes also affect nutrient cycling and biogeochemical processes in soils and water. These processes affect the vegetation and plant communities which can establish in the washes. As

discussed in Section 3.3.1.2, the principal throughgoing stream channels appear to be currently "in balance" (i.e., the reaches of the principal washes within the Project mine and process area are currently neither depositing nor eroding sediment, but simply carrying it through the proposed Project mine and process area). The majority of the Project area is subject to very slow erosional deflation by wind. Wash bottoms have a veneer of recently deposited gravelly rock in the wash bottoms with sand and gravel along the banks. This erosional material moves through the site by the flushing action of water flow following infrequent storm events (Bamberg and Hanne, 1995). Surface runoff from this region, which comprises a portion of the Chocolate Mountains basin area, and includes the Project area, drains into individual isolated areas along the eastern boundary of the Algodones Dunes foothills, providing moisture to pockets of microphyll vegetation.

3.5.4.2. Special Biological Resource Management Areas

The Project area is located within the BLM's California Desert Conservation Area (CDCA) and is subject to the applicable plans and goals of the CDCA Plan. The CDCA Plan (1980) indicates that a prescriptive Habitat Management Plan (HMP) would be prepared by the BLM for the Indian Wash area, which includes the Project area. The long-term goals for the Indian Wash HMP stated in the CDCA Plan were to protect, stabilize, and/or enhance wildlife resource values in the area. The Indian Wash HMP would set forth management actions to meet these goals, including: (a) control of vehicle use; (b) ~~restricting~~ restriction of camping and parking; and (c) ~~increased~~ increasing surveillance in the area. The BLM has not yet prepared or implemented the Indian Wash HMP (Personal Communication - Nancy Nicolai, BLM; July 1, 1996).

Two (2) wilderness areas, Indian Pass Wilderness Area and Picacho Peak Wilderness Area, are located north and east of the Project area, respectively (see Figure 3-12). While not specifically developed as biological resource management areas, significant protection to plants and animals within these areas is afforded by their designation as wilderness.

The USFWS has designated specific areas as desert tortoise critical habitat in an effort to manage the recovery of this species. The nearest desert tortoise critical habitat to the Project area is the Chuckwalla Unit, located at its closest approximately two (2) miles northwest of the Project mine and process area (see Figure 3-12).

Figure 3-12: Special Biological Resource Management Areas Located in the Vicinity of the Project Area

3.5.5. Vegetation

Vegetation within the Project area is characterized by: (a) tree/shrub vegetation in and adjacent to the ephemeral stream channels; and (b) shrub/scrub vegetation on the upland areas between the stream channels (Bamberg and Hanne, 1995b). Vegetation associations within the Project area are shown on Figure 3-13. All of the vegetation is highly adapted to be able to succeed in the harsh environment.

Dominant species within the channels include ironwood (*Olneya tesota*) and palo verde (*Cercidium floridum*), with a diverse plant association containing cat's-claw (*Acacia greggii*), purple heather (*Krameria erecta*), desert lavender (*Hyptis emoryi*), Anderson thornbush (*Lycium andersonii*) and yellow felt-plant (*Horsfordia newberryi*). Dominant desert scrub species include creosote bush (*Larrea tridentata*), burrobush (*Ambrosia dumosa*), ocotillo (*Foaquieria splendens*), and brittlebush (*Encelia farinosa*). Several sparsely populated cactus species are found within this habitat, including Bigelow cholla (*Opuntia bigelovii*), cottontop cactus (*Echinocactus polycephalus*), beavertail cactus (*Opuntia basalaris*), diamond cactus (*Opuntia ramosissima*), and California barrel cactus (*Ferocactus cylindiceus*).

A site-specific baseline vegetation survey of the entire Project mine and process area and a buffer zone (total of approximately 1,700 acres) was conducted in June 1995 by Bamberg and Hanne (August 1995b). The report of the vegetation survey is provided as Appendix F to this EIS/EIR. The survey report notes that the weather during the spring of 1995 included significant rains which provided abundant moisture and the washes had flowed for a short period of time. In addition, the previous three (3) years had also been a wet cycle with periods of heavy rain that resulted in extremely favorable conditions for plant growth and productivity in the Project area. This was evident in the good growth observed in perennial trees and shrubs, and by herbaceous annuals, during the survey. Vegetative growth was reported to have been higher over the last three (3) years than it had been in the previous 15-20 years. The results of the vegetation survey were interpreted to represent the highest cover and diversity possible in the Imperial Project area with more than four times (>4x) the cover which would be expected following a series of dry years.

Vegetation within the Project mine and process area is categorically creosote shrub type, but for the purposes of the survey the vegetation was subdivided into shrub/scrub vegetation observed on the open, drier alluvial flats and slopes; and tree/shrub vegetation observed on the sides of washes and drainages. Approximately 95 percent of the Project mine and process area is the shrub/scrub type with an almost non-existent vegetative ground cover. These upland areas were further subdivided into three (3) topographic subtypes as summarized below:

Figure 3-13: Vegetation and Habitat Associations Within the Imperial Project Area

- Desert pavement: Covers an estimated 35 percent of the uplands; vegetation is extremely scarce; water and seeds cannot generally penetrate the surface; estimated vegetative ground cover at the time of the survey ranged from 0 to 0.5 percent.

- Alluvial flats and slopes: Covers an estimated 64 percent of the uplands; characterized as areas within the desert pavement that have had their alluvial surfaces disturbed in the last 1,000 years by erosion or deposition; spacing of plants by clumping in favorable areas; vegetative ground cover estimated at the time of the survey ranged from 7 to 9 percent.

- Rock outcrop/thin soil: Occurs in a small (1 percent) upland area in the north-central portion of the site; characterized by vegetation growing in cracks and between rocks; vegetation density is very low and clumped; vegetative ground cover estimated at the time of the survey was 2 to 4 percent.

The tree/shrub vegetation type occurs on the sides and banks of the washes, and represents a total of approximately 5 percent of the Project mine and process area. Two (2) topographic subtypes were identified as follows:

- Broad major washes: Drainages which cross the study area and continue out onto the broad alluvial flats southwest of the Project area toward the Algodones Dunes; characterized as washes ranging from almost flat to fifteen (15) feet ~~(15')~~ deep and eight (8) to 225 feet (average 40 feet~~'~~) wide; plant cover at the time of the survey ranged from 0 percent in the sandy bottom areas to 66 percent on some sides and mid-wash clumps.

- Shallow subsidiary washes: Narrower (average 30 feet~~'~~) than the broad major washes and not as deep; finer soils washed or deposited within them; fewer and smaller trees with additional species present; plant cover at the time of the survey was irregular on the bottoms and the sides of these secondary drainages and averaged 35 to 45 percent.

During the vegetation survey evidence of previous human disturbance within the Project mine and process area was ~~evident~~ observed including roads and access trails and some previous trenching for exploration in the rock outcrop area. Plants had been periodically collected or cut, in particular, many of the older ironwood trees had been cut and were left as old stumps or resprouted bases on the sides of washes throughout the Project mine and process area.

Rado (1995) observed heavy prior cutting of ironwood trees in all of the washes within the Project area extending for at least one and one-half (1½) miles in each

direction from the Project mine and process area. This was evidenced by old ironwood stumps and discarded branches. The reason for the heavy cutting of ironwood trees is unknown, but it has probably resulted in the loss of many ironwood trees, reduced the tree canopy and degenerated the microphyll woodland habitat in the area. Little regeneration of the ironwoods has occurred (Personal Communication - Ted Rado, 1996).

No perennial streams, riparian habitat, or wetland areas exist on or adjacent to the Project area (see Section 3.3.1.3). Further, no star dunes, sheet dunes, wind-accumulated sand deposits or other aeolian sand deposits exist within the Project area (Rado, 1995).

3.5.5.1. Special Status Species

A total of ~~twenty three (23)~~ 22 federal or state listed or proposed T/E plant species; USFWS special status species (e.g., former C2 or C3 candidate species); and BLM sensitive plant species were identified which are known to occur in the general vicinity of the Project area (Rado, 1996). These species are identified in Table 3-7. However, ~~sixteen (16)~~ eleven (11) of these identified plant species do not have potential habitat within the Project area. ~~For example~~ These include: (Pierson's milk-vetch (*Astragalus magdalena* var. *Piersonii*), Algodones Dunes sunflower (*Helianthus niveus* ssp. *tephrodes*), giant spanish needle (*Palafoxia arida* var. *gigantea*), Borrego milk-vetch (*Astragalus lentiginosus* var. *borreganus*), Hardwood's milk-vetch (*Astragulus insularis* var. *harwoodii*), Wiggins cholla (*Opuntia wigginsii*), sand food (*Pholisma sonorae*), and Wiggin's croton (*Croton wigginsii*), which are typically found in sand dunes; rock nettle (*Eucnida rupestris*), which is confined to an isolated occurrence in California located 60 miles west of the Project area; ~~California ditaxis (*Ditaxis california*) is only present in isolated populations in sandy washes;~~ Glandular ditaxis (*Ditaxis clariana*), which is found only in Mojave scrub or Sonoran desert scrub/sandy soils not present on the Project area ~~site~~; and Munz's cholla (*Opuntia munzii*), which is found in lower fans and plains.

Table 3-7: Plant Species of Concern Known to Occur in the Vicinity of the Imperial Project Area

Common Name	Scientific Name	Status[a]
Pierson's milk-vetch	*Astragalus magdalena* var. *Piersonii*	BLM/FPE/SE/CNPS-1B[b]
Borrego milk-vetch	*Astragalus lentiginosus* var. *borreganus*	CNPS-4/SP[b]
Hardwood's milk-vetch	*Astagalus insularis* var. *hardwoodii*	CNPS-2[b]
Ribbed cryptantha	*Cryptantha costata*	CNPS-4/SP

Common Name	Scientific Name	Status[a]
Winged cryptantha	*Cryptantha holoptera*	CNPS-4/SP
Fairy duster	*Calliandra eriophylla*	CNPS-2/SP
Rock nettle	*Eucnida rupestris*	CNPS-2/SP[b]
California ditaxis	*Ditaxis californica*	BLM/USFWS/CNPS-1B[b]
Glandular ditaxis	*Ditaxis clariana*	CNPS-2[b]
Hairy stickleaf	*Mentzelia hirsutissima*	USFWS/CNPS-2/SP
Slender-lobed four o'clock	*Mirabilis tenuiloba*	CNPS-4/SP
Wiggin's cholla	*Opuntia wigginsii*	BLM/USFWS/CNPS-3/SP[b]
Sand food	*Pholisma sonorae*	BLM/CNPS-1B[b]
Foxtail cactus	*Escobaria vivipara* var. *alversonii*	BLM/USFWS/CNPS-1B/SP
Algodones Dunes sunflower	*Helianthus niveus* ssp. *tephrodes*	BLM/USFWS/SE/CNPS-1B/SP[b]
Munz's cholla	*Opuntia munzii*	BLM/USFWS/CNPS-1B/SP[b]
Giant spanish needle	*Palafoxia arida* var. *gigantea*	BLM/USFWS/CNPS-1B/SP[b]
Orocopia sage	*Salvia greatei*	BLM/USFWS/CNPS-1B/SP
Wiggin's croton	*Croton wigginsii*	BLM/USFWS/SR/CNPS-3/SP[b]
~~Algodones creosote bush~~	~~*Larrea tridentat var. arenaria*~~	~~CNPS-2[b]~~
Desert unicorn plant	*Proboscidia althaefolia*	CNPS-4[b]
Thurber's pilostyles	*Pilostyles thurberi*	CNPS-4[b]
Crown-of-thorns	*Koebeslina spinosa*	CNPS-2[b]

[a]Legend:
FPE: Federal proposed for endangered status
SE: California state listed as endangered
SR: California state rare species
CNPS: California Native Plant Society;
- 1B - Taxa determined to be rare, threatened or endangered;
- 2 - Species rare or endangered in California but common elsewhere;
- 3 - More information on status needed; and
- 4 - Species of limited distribution.

SP: California Special Plant
USFWS: Designated as a Special Status Species by the U.S. Fish and Wildlife Service
BLM: Designated a BLM Sensitive Species
[b]No potential habitats for species present within the Imperial Project area

The following plant species have geographic ranges and preferred habitats that indicate that they may potentially occur within or near the Project area. Descriptions ~~on~~ of the species ~~and other data~~ are provided below.

Foxtail cactus: Foxtail cactus is a small cactus associated with rocky alluvial slopes and hills. The distribution of the species ranges from approximately western Joshua Tree National Park southeast to the Chuckwalla Mountains of southeastern California (Munz, 1974). In appearance, the foxtail cactus consists of one (1) to a few stems that branch from a common base to a height of about eight (8) inches. The identifying characteristic of this species are the elongated spines that are white at the base, but transitionally change color to red or purple near the tip, giving the plant an appearance like a fox's tail. Flowers are purple to magenta in coloration and bloom in May and June (Munz, 1974; BOR, 1996). The species is threatened by collecting (Skinner and Pavlik 1994).

Ribbed cryptantha: The ribbed cryptantha is a small annual in the Borage family characterized by ashen stems and leaves, with "ribbed" sepals (Jaeger, 1941). Flowers are white, and bloom between April and May. It is uncommonly distributed in California on sandy soils and gravelly alluvial fans in the Colorado Desert between Palm Springs and Yuma below 1,500 feet in habitats dominated by creosote bush (Jaeger, 1941; Munz, 1941).

Winged cryptantha: The winged cryptantha ~~(a.k.a. Winged forget-me-not)~~ is also a small annual in the Borage family, characterized by rough-hairy herbage, and a "completely winged" seed (Jaeger, 1941). The species grows upright and may reach a height of about two (2) feet. White flowers bloom in March-April (Skinner and Pavlik, 1994). It is irregularly distributed from the vicinity of Palm Springs to the Colorado River in California, present in gravelly and rocky habitats dominated by creosote bush below 2,000 feet (Munz, 1974). The winged ~~forget-me-not~~ cryptantha is found in ephemeral stream channels and washes throughout the Colorado Desert, in the eastern Mojave Desert of California and Nevada, and in the Sonoran Desert of Arizona. The plants are not considered "rare" but are uncommon enough that CNPS recommends that their status be monitored. It has been previously recorded during area surveys for other projects in the area (Pritchett, 1984; BLM and County of Imperial, 1995).

Fairy duster: Fairy duster is a low, rounded shrub with dark green acacia-like leaves. Flowers are scarlet and white, and bloom in January through March (Skinner and Pavlik, 1994). It is closely associated with the edges of smaller washes in southeastern California desert regions (Jaeger, 1941). It has been noted during botanical surveys of this general area (Environmental Solutions, 1987; Office of Arid Lands Studies, 1993).

California ditaxis: California ditaxis is a woody perennial herb, approximately eighteen (18) inches in height, associated with sandy washes and canyons distributed between the Santa Rosa Mountains and the southern side of the Eagle

Mountains in Riverside County and San Diego County (Munz, 1974; Skinner and Pavlik, 1994). Distribution of plants appears to be spotty, with fewer than twenty (20) known occurrences, most consisting of few plants (Skinner and Pavlik, 1994). Flowers are white in color. The California Desert Plan (BLM, 1980) records a population of California ditaxis near Picacho Peak, approximately ten (10) miles east of the Project area. This may represent an error, since the record is substantially southeast of the known geographic range (Munz, 1974), and subsequent literature (CNPS, 1988; Skinner and Pavlik, 1993) do not address this locality. California ditaxis was not documented during surveys of the Project area (Rado, 1995), nor in neighboring project sites (Office of Arid Lands Studies, 1992; DeDyker and Associates, 1994). It is considered a "Special Status Species" by the USFWS and is a Category 1B taxon (i.e., plants rare, threatened or endangered in California and elsewhere) by the CNPS (Skinner and Pavlik, 1994).

Hairy stickleaf: This is an annual blazing star, consisting of erect stems rising to ten (10) or more inches in height. The orange-colored flowers bloom in March-April. It is closely associated with coarse rock rubble and rocky slopes in creosote bush habitats below 2,000 feet. The geographic range in California is principally confined to Imperial County and eastern San Diego County. Localities include Box Canyon, Palm Canyon and Mountain Springs grade (Munz, 1974). It has been previously recorded from this general area (CNPS, 1988).

Slender-lobed four o'clock: Slender-lobed four o'clock is a perennial herb, with many branches extending from a base to a height of about 1.5 feet (Jaeger, 1941). Flowers are white and bloom in March through May. The plant is closely associated with rocky slopes below 1,500 feet elevation in creosote bush habitats (Munz, 1974). The geographic range extends from the western edge of the Colorado Desert south into Baja California (Jaeger, 1974).

Orocopia sage: Orocopia sage is a sparsely-distributed spiny-leaved shrub associated with gravelly washes below 600 feet in elevation in the Orocopia Mountains and Chocolate Mountains areas of southeastern California (Jaeger, 1941; Munz, 1974). Its lavender flowers bloom in March to April.

Desert unicorn plant: Desert unicorn plant is a coarse spreading perennial species, associated with creosote bush scrub habitats in Imperial, San Diego and Riverside Counties in California. The geographic range of this taxon also includes portions of Sonora, Mexico; Baja California, Mexico; and the state of Arizona (CNPS, 1988). Flowers are yellow to orange, with maroon streaking on the lower lobe and spotted along the sides of the "throat." It is uncommonly distributed throughout its range, and associated with sandy substrates (Munz, 1974; Hickman, 1993). It was not documented in the Project area during site

surveys (Rado, 1995) and has not been recorded during surveys of the nearby Mesquite Mine (Office of Arid Lands Studies, 1992) or American Girl Oro Cruz Project sites (DeDyker and Associates, 1994). Desert unicorn plant has no federal or state status. It is listed by the CNPS as a List 4 species (i.e., a "watch list" species).

Thurber's pilostyles: Thurber's pilostyles is a stem parasite associated with indigobush (*Dalea*, especially *Dalea emoryi*)(Munz, 1974). Distribution of this plant in California is confined to creosote bush scrub habitats in Riverside, San Diego, and Imperial Counties in California. The geographic range of this plant also includes Arizona, Nevada, Texas, and Baja California (CNPS, 1988; Hickman, 1993). The plant, in appearance, is quite small, with scale-like leaves and flowers. Flowers are brown in coloration and minute in size (Munz, 1974). The preferred host plant species, *Dalea emoryi*, was not documented during surveys of the Project area (Rado, 1995). Thurber's pilostyles has not been documented during surveys of the Mesquite Mine area (Office of Arid Lands Studies, 1992) or the American Girl Oro Cruz Project site (DeDyker and Associates, 1994). Thurber's pilostyles has no federal or state status. It is listed by the CNPS as a List 4 species (i.e., a "watch list" species).

Crown-of-thorns: Crown-of-thorns is a nearly leafless deciduous shrub consisting of pale green, spine-tipped branchlets (Munz, 1974). Flowers are small and greenish white in coloration. The species is present in washes in creosote bush scrub. It has been reported from the Chocolate Mountains in Imperial County (Munz, 1974) east into parts of Sonora, Mexico; Arizona; and Texas (Munz, 1974; Hickman, 1993). In California it is known from fewer than ten (10) occurrences (Skinner and Pavlik, 1994). Crown-of-thorns is highly visible and readily identified in areas where it occurs, but it was not documented during surveys of the Project area (Rado, 1995), or during surveys of the Mesquite Mine area (Office of Arid Lands Studies, 1992) or the American Girl Oro Cruz Project site (DeDyker and Associates, 1994). Crown-of-thorns has been listed by the CNPS as a List 2 taxon (i.e., plants rare, threatened, or endangered in California but more common elsewhere). It is not a federal- or state-listed species.

3.5.5.2. Botanical Survey Findings

Systematic pedestrian botanical surveys of the entire Project area, including the proposed Project mine and process area, access corridor, water well corridors, ~~and~~ alternate transmission line corridor, including buffer areas, were conducted during multiple visits to the Project area in July, August, and September 1994 and in February, April, and May 1995 (Rado, 1995). In addition, incidental observations on sensitive botanical species were made during the pedestrian

biological survey of the existing 34.5 kV transmission line which will be overbuilt (see Section 3.5.6.2). A total of 116 plant taxa were identified within the survey area. This includes a few introduced species of plants, mainly annuals such as mustards and grasses, occurring within the Project area. Plants observed during the surveys were reported as typical of wash and desert scrub plant associations in the Colorado Desert (Rado, 1995). The botanical survey included collection of prior data from the area, California Native Plant Society (CNPS) data (CNPS, 1984; CNPS, 1988), and a review of prior biological survey reports conducted in the general area (Turner et al., 1980; Pritchett, 1984; Kiva Biological Consulting, 1991; Office of Arid Lands Studies, 1993; Environmental Solutions, 1987; BLM, undated; and BLM, 1994b). A detailed summary of the findings and observations made during the botanical surveys is provided in the biological survey report, which is attached as Appendix G.

The biological survey report indicates that no state or federal listed, proposed, or ~~former candidate plant~~ special status species were observed on the survey lands, nor have any state or federal listed, proposed, or ~~former candidate plant~~ special status species been reported to exist within the Project area. A single sensitive plant species, the fairy duster, was observed within the Project area. The presence of fairy duster was common in virtually all of the ephemeral stream channels throughout the Project area. This species was restricted to the ephemeral stream channels, where it was generally present along wash edges and banks. It was most commonly observed in smaller channels which were between approximately two (2) and ~~to~~ eight (~~2~~-8) feet in width. A total of 285 individual plants were observed, and the actual number present within the Project area probably exceeds 500 (Rado, 1996).

One CNPS List 4 (i.e., "watch" list) species, Winged ~~forget-me-not~~ cryptantha, was found in larger stream channels throughout the Project mine and process area. A total of 53 individual plants were observed, and it was assumed that the actual number of plants was higher (Rado, 1996). The plants were distributed along the edges of the larger washes within the Project area.

Foxtail cactus, ribbed cryptantha, California ditaxis, hairy stickleaf, slender-lobed four o'clock, orocopia sage, desert unicorn plant, Thurber's pilostyles, and crown-of-thorns were not documented during biological surveys of the Project area (Rado, 1995).

3.5.6. Wildlife

Wildlife within the vicinity of the Project area is characteristic of the Eastern Colorado Desert (Rado, 1995). Bamberg and Hanne (1995b) roughly estimated that 95 percent of the Project mine and process area is comprised of desert scrub habitat with predominantly scrub vegetation and relatively little succulent vegetation. The remaining estimated 5 percent of the Project mine and process area, restricted to the wash bottoms and neighboring areas, is comprised of tree/shrub vegetation, generally equivalent to microphyll woodland habitat. Independently, Rado (1995) utilized aerial photographs to map the two (2) major habitat associations (see Figure 3-13). Based upon the Rado map, approximately ~~142~~ 140 acres of microphyll woodland habitat exists within the boundaries of the Project mine and process area (about 8.6 percent of the area). This estimate includes both vegetated areas along the banks and slopes of the drainages, and the less vegetated wash bottoms. Microphyll woodland is considered sensitive habitat by the CDFG.

The following common species inhabit or occasionally visit the Project area:

<u>Reptiles</u>: zebra-tailed lizard (*Callisaurus draconoides*), side-blotched lizard (*Uta stansburiana*), western whiptail (*Cnemidophorus tigris*), and desert iguana (*Dipsosaurus dorsalis*);

<u>Birds</u>: Using microphyll woodland habitat - mourning doves (*Zenaida macroura*), Gambels's quail (*Lophortyx gambelii*), Say's phoebes (*Sayornis saya*), and black-tailed gnatcatchers (*Polioptila melanura*);

Using desert succulent scrub habitat - black-throated sparrow (*Amphispiza bilineata*), loggerhead shrike (*Lanius ludovicianus*), and cactus wren (*Campylorhynchus brunnecapillus*);

<u>Raptors</u>: Multiple raptor species would be expected to periodically forage or migrate through the area, including: golden eagle (*Aquila chrysaetos*), red-tailed hawk (*Buteo jamaicensis*), sharp-shinned hawk (*Accipiter striatus*), American kestrel (*Falco sparverius*), prairie falcon (*Falco mexicanus*), northern harrier (*Circus cyaneus*), western screech-owl (*Otus kennicottii*), great horned owl (*Bubo virginianus*), and turkey vulture (*Cathartes aura*).

<u>Mammals</u>: antelope ground squirrel (*Ammospermophilus leucurus*), Merriam kangaroo rat (*Dipodomys merriami*), desert woodrat (*Neotoma lepida*), black-tailed jackrabbit (*Lepus californicus*), deer (*Odocoileus hemionus*), kit fox

(*Vulpes macrotis*), coyote (*Canis latrans*), American badger (*Taxidea taxa*), and wild burro (*Equus asinus*).

3.5.6.1. Species of Concern

A total of ~~sixty-two (62)~~ federal or state listed or proposed T/E wildlife species; USFWS special status species; BLM sensitive species; and/or California species of concern were identified which are known to occur in the general vicinity of the Project area (Rado, 1995). These species are identified in Table 3-8. Thirty-three (33) of these identified wildlife species do not have potential habitat within the Project area. For example, several sensitive species, including~~:~~ the Andrews' dune scarab beetle (*Pseudocotalpa andrewsi*)~~, flat-tailed horned lizard (*Phrynosoma mcallii*),~~ and Colorado Desert fringe-toed lizard (*Uma n. notata*), are closely associated with fine sand substrates not present in the Project area~~. Other sensitive species, including: burrowing owl (*Athene cunicularia*), prairie falcon, Cooper's hawk (2), Le Conte's thrasher (*Toxostoma lecontei*), and ferruginous hawk (*Buteo regalis*) could possibly use the Project area, but none of these species were observed during the on-site surveys. Another sensitive species, the white-throated woodrat (*Neotoma albigula venusta*), is typically found in areas with large mesquite hummocks or dense stands of beavertail cactus, none of which are located within the Project area~~ (Rado, 1995).

Table 3-8: Wildlife Species of Concern Known to Occur in the Vicinity of the Imperial Project Area

Common Name	Scientific Name	Status[a]
Alkali skipper	*Pseudocopaedes eunus eunus*	BLM/USFWS[b]
Cheeseweed owlfly	*Oliarces clara*	BLM/USFWS
Andrews' dune scarab beetle	*Pseudocotalpa andrewsi*	BLM/USFWS[b]
Brown-tassel trigonoscuta weevil	*Trigonoscuta brunnotasselata*	BLM/USFWS[b]
Desert pupfish	*Cyprinodon macularius*	BLM/FE/SE[b]
Razorback sucker	*Xyrauchen texanus*	BLM/FE/SE[b]
Flannelmouth sucker	*Catastomus latipinnis*	BLM/USFWS[b]
Roundtail chub	*Gila robusta*	BLM/USFWS[b]
Colorado squawfish	*Ptychocheilus lucius*	FE/SE[b]
Arizona southwestern toad	*Bufo microscaphus microscaphus*	BLM/USFWS/CSC[b]
Yavapai leopard frog	*Rana yavapaiensis*	BLM/USFWS[b]

Common Name	Scientific Name	Status[a]
Couches' spadefoot toad	*Scaphiopus couchi*	BLM/USFWS/CSC[b]
Desert tortoise	*Gopherus agassizii*	BLM/FT/ST
Flat-tailed horned lizard	*Phrynosoma mcallii*	BLM/FPT/CSC
Chuckwalla	*Sauromalus obesus*	BLM/USFWS
Colorado Desert fringe-toed lizard	*Uma notata notata*	BLM/USFWS/CSC[b]
Bald eagle	*Haliaeetus leucocephalus*	BLM/SE/FE[b]
Brown pelican	*Pelecanus occidentalis*	BLM/FT/ST[b]
Peregrine falcon	*Falco peregrinus*	BLM/USFWS/FE/SE
Yuma clapper rail	*Rallus longirostris yumanensis*	BLM/FE/SE[b]
Aleutian Canada goose	*Branta canadensis leucopareia*	BLM/FT/ST[b]
Southwestern willow flycatcher	*Empidonax traillii extimus*	BLM/FPE/SE[b]
Arizona Bell's vireo	*Vireo bellii arizonae*	BLM/SE[b]
Western yellow billed cuckoo	*Coccyzus americanus occidentalis*	SE[b]
California black rail	*Laterallus jamaicensis coturniculus*	BLM/USFWS/ST[b]
Black tern	*Chilodonias niger*	BLM/USFWS/CSC[b]
Burrowing owl	*Athene cunicularia*	BLM/USFWS/CSC
LeConte's thrasher	*Toxostoma lecontei*	CSC
Golden eagle	*Aquila chyrsaetos*	CSC
Prairie falcon	*Falco mexicanus*	CSC
Ferruginous hawk	*Buteo regalis*	BLM/USFWS/CSC
Sharp-shinned hawk	*Accipiter striatus*	CSC
Northern harrier	*Circus cyaneus*	CSC
Cooper's hawk	*Accipiter cooperii*	CSC
Large-billed savannah sparrow	*Passerculus sanwichensis rostratus*	BLM/USFWS/CSC[b]
Loggerhead shrike	*Lanius ludovicianus*	BLM/USFWS/CSC
Black-tailed gnatcatcher	*Polioptila melanura*	CSC
Long-eared owl	*Asio otus*	CSC
Barn owl	*Tyto alba*	CSC
Elf owl	*Micrathene whitneyi*	SE[b]
Gila woodpecker	*Melanerpes uropygialis*	BLM/USFWS/SE
Mountain plover	*Charadrius montanus*	BLM/USFWS[b]
Western least bittern	*Ixobrychus exilis hesperus*	BLM/USFWS/CSC[b]
White-faced ibis	*Plegadis chihi*	BLM/USFWS/CSC[b]
Crissal thrasher	*Toxostoma dorsale*	CSC

Common Name	Scientific Name	Status[a]
Vaux's swift	*Chaetura vauxi*	CSC
Gilded northern flicker	*Colaptes auratus chrysoides*	SE[b]
California leaf-nosed bat	*Macrotus californicus*	BLM/USFWS/CSC
Greater western mastiff bat	*Eumops perotis californicus*	BLM/USFWS/CSC
Occult little brown bat	*Myotis lucifugus occultus*	BLM/USFWS/CSC
Spotted bat	*Euderma maculatum*	BLM/USFWS/CSC
Small-footed myotis	*Myotis ciliolabrum*	BLM/USFWS
Yuma myotis	*Myotis yumanensis*	BLM/USFWS
Cave myotis	*Myotis velifer*	BLM/USFWS/CSC
Desert pallid bat	*Antrozous pallidus pallidus*	CSC
Townsend's big-eared bat	*Plecotus townsendii*	BLM/USFWS/CSC
Yuma hispid cotton rat	*Sigmodon hispidus eremicus*	BLM/USFWS/CSC[b]
White-throated woodrat	*Neotoma albigula venusta*	BLM/USFWS/CSC
Colorado River cotton rat	*Sigmodon arizonae plenus*	BLM/USFWS/CSC[b]
Yuma puma	*Felis concolor browni*	BLM/USFWS/CSC
American badger	*Taxidea taxus*	CSC
~~Desert bighorn sheep~~	~~*Ovis canadensis nelsoni*~~	~~BLM[b]~~

[a]Legend:

FE: Federal listed as endangered
FPE: Federal proposed for endangered status
FT: Federal listed as threatened
FTE: Federal proposed for threatened status
SE: California state listed as endangered
ST: California state listed as threatened
SP: California Special Plant
BLM: Designated a sensitive species by the U.S. Bureau of Land Management
USFWS: Designated a special status species by the U.S. Fish and Wildlife Service
CSC: California species of concern

[b]No potential habitats for species present within the Imperial Project area

The following wildlife species have geographic ranges and preferred habitats that indicate that they may potentially occur on or near the Project area. Descriptions of the species, together with results of ~~site~~ historic surveys, ~~and other data,~~ are provided below.

Cheeseweed owlfly: The cheeseweed owlfly is closely related to lacewings, antlions, and fishflies in the insect order Neuroptera. It is approximately

1.5 inches in length and resembles a large winged termite. Eggs are laid and hatch in the soil. Larvae burrow into the soil and attach to roots of their host plant, creosote bush. Adults emerge from the soil between March and May, in aggregations that are short-lived, typically less than four (4) days in duration (Faulkner, 1990). The emergence of adults for breeding does not follow a regular pattern, but is dependent upon preceding winters of high precipitation; during dry years no emergence may occur (Faulkner, 1990).

The distribution of this species in the deserts of southeastern California, southern Nevada and western Arizona is not well understood. Widely dispersed locality records and the wide distribution of the host plant, creosote bush, suggest that the species is difficult to document due to its unpredictable and short-duration emergences as an adult (BOR, 1996). Locality records are widely dispersed, and include the vicinity of Mecca (California), near Parker (Arizona), the Gila Mountains (Arizona), Boulder City (Nevada), Telegraph Pass (Arizona), Black Mountain (California), along the road between Rice and Blythe (California), and the vicinity of Palm Springs (California) (BOR, 1996). There is no text in the literature identifying the species as rare and, given the huge range of locality records for its host plant, the species could actually be common, but because of its irregular emergence pattern it is difficult to observe. The species was originally listed as a Category 2 species (i.e., more information is needed), and it is currently considered a special status species by the USFWS and a sensitive species by the BLM (Personal Communication - Ted Rado, 1996).

Flat-tailed horned lizard: The flat-tailed horned lizard is a medium-sized horned lizard, approximately six (6) inches in total length, that ranges from southeastern California into extreme southwestern Arizona and Sonora, Mexico. Coloration is usually whitish, with a narrow dark stripe extending down the center of the back. A series of six (6) elongated head scales, typical of the genus, are located at the base of the skull. The centermost of these head spines (called occipital horns) are unusually elongate~~,~~ and, together with the long flattened tail and center dark dorsal stripe, distinguish this horned lizard species from other members of the genus (Smith, 1967).

The flat-tailed horned lizard is principally associated with sandy habitats, often interspersed with harder soils that ~~allow~~ support colonies of harvester ants, a primary food source for this lizard (CDFG, 1991). The flat-tailed horned lizard is generally considered to be difficult to locate, and relatively rare throughout its geographic range (Norris, 1949; Klauber, 1939). Regional surveys to determine relative abundance and distribution have confirmed this scarcity (Turner et al, 1978, 1980b), and also suggest declines where prior researchers have documented relatively high abundance, such as at the Algodones Dunes (Mayhew, 1965).

In California, the geographic range of the flat-tailed horned lizard extends over approximately 2,700 square miles. A total of 330 square miles of this area, located in the East Mesa and Yuha Basin of central Imperial County, have been identified as optimal habitat for this species (Turner et al., 1980b; Rado, no date). A series of analyses of effects to flat-tailed horned lizards and habitats have been undertaken. Rado (no date) initially reviewed factors such as agricultural development, pesticide spraying, recreational use, and mineral development within both optimal habitat and the geographic range of this species. He concluded that 52 percent of the geographic range of the flat-tailed horned lizard in California is within areas subject to one (1) or more use-oriented activities, and that this included 57 percent of optimal habitat for the species. Subsequent re-evaluation in 1986 concluded that one (1) or more use-oriented activities were occurring on 95 percent of flat-tailed horned lizard optimal habitat (Mayhew and Carlson, 1986). Repeat surveys on flat-tailed horned lizard optimal habitat on Bureau of Land Management lands at East Mesa and Yuha Basin have also recorded declines in relative abundance in both areas (Olech, no date). The documented scarcity of this species, high degree of threats to habitat, and documented declines in populations have resulted in the proposal to list the flat-tailed horned lizard as a threatened species (58 Federal Register 62624-62629).

Nearest locality records to the ~~Chemgold Imperial Project site~~ Project mine and process area are from the vicinity of Ogilby (Townships 15 and 16 South, Range 20 East), located approximately ten to twelve (10-12) miles south-southwest along the eastern edge of the Algodones Dunes (Bolster, 1989). Turner et al. (1980a), completing a range-wide inventory of Public Lands administered by the BLM for the flat-tailed horned lizard, did not document the species within any Townships encompassing the Project area. Reasons for this apparent absence probably relate to substrate. The Project mine and process area, the Project ancillary area, ~~access route leading to this site from Ogilby Road,~~ and transmission line corridor consist of desert pavement, coarse gravel, and compacted gravelly sands not occupied by this species. Jennings and Hayes (1994), in a comprehensive overview for the California Department of Fish and Game, state that the flat-tailed horned lizard "...is a specialized sand-dweller that has not been observed outside of areas with a shifting sand substrate." Most records for flat-tailed horned lizards come from the creosote (*Larrea tridentata*) white bursage (*Ambrosia dumosa*) series of Sonoran desert scrub (Turner and Brown, 1982). It is this open community in association with sandy flats and valleys that is often described as flat-tailed horned lizard habitat (Stebbins, 1985; Turner and Medica, 1982; Rorabaugh *et al.*, 1987). Although most records for the species are from sandy flats or areas with a veneer of fine, windblown sand, the flat-tailed horned lizard has also been collected or observed in areas with little or no windblown sand, such as badlands in the Yuha Basin and the Borrego

Valley, and on saltbush flats at the northeastern end of the Salton Sea (Turner *et al.*, 1980). The species has also been recorded in the mixed scrub series of Sonoran desert scrub (Turner and Brown, 1982), on gravelly soils in Anza-Borrego Desert State Park, and in association with senita cactus (*Lophocereus schotti*) in Sonora, Mexico. Flat-tailed horned lizards are probably absent or rare in the unvegetated portions of major dune systems, such as the Algodones Dunes and the dunes of the Gran Desierto (Luckenbach and Bury, 1983; McCalvin, 1993).

Chuckwalla: The chuckwalla is a large robust nonvenomous lizard species closely associated with rock outcrops and rock crevices in the Mojave, Colorado, and Sonoran deserts (Stebbins, 1966). Total length in males may approach eighteen (18) inches. Overall body shape is flattened, with loose skin folds on the sides, and a large fleshy tail used to store fat. Scalation consists of many fine scales, giving the skin a sand-paper texture. Food consists of a variety of plants including the flowers of creosote bushes. Coloration is highly variable, and usually approximates that of the rock outcrops inhabited by a particular population. Typically the body is dark, with a lighter tail (Miller and Stebbins, 1964; Stebbins, 1966; Smith, 1967).——

Desert tortoise: The desert tortoise is widely distributed over portions of the Mojave, Sonoran, and Colorado deserts of the western United States and northwestern Mexico. Habitats occupied include plains and valleys in the Mojave Desert, bajadas and low mountain slopes in the Sonoran Desert, and thorn scrub forest in Mexico. Dominant vegetation includes creosote bush, burrobush, Joshua trees, ocotillo, palo verde, and several species of saltbush (Woodbury and Hardy 1948; Schwartzmann and Ohmart, 1977; Berry, 1975 and 1984). Critical habitat for the species has been identified by the USFWS, and the BLM has established Desert Wildlife Management Areas (DWMA's) as part of the Desert Tortoise (Mojave Population) Recovery Plan (1994). The nearest desert tortoise critical habitat to the Project area is the Chuckwalla Unit, the southern end of which is located approximately two (2) miles northwest of the Project mine and process area (see Figure 3-12).

The desert tortoise is a highly adapted, adept digger. Burrows are constructed to avoid harsh temperatures and to avoid predators. Burrows used by tortoises include a shallow "pallet" that is used regularly during seasonal activity periods, and a deeper, more extensive burrow that is used during periods of inactivity (Woodbury and Hardy, 1948; Berry, 1975). Burrows may be constructed almost anywhere, including under boulders, canopies of shrubs, wash embankments, or in the open (Woodbury and Hardy, 1948; Berry, 1972; Burge and Bradley, 1976; Coombs, 1977).

The species is herbivorous. Tortoises eat a variety of annual flowers, perennial grasses, a few half shrubs, and flowers of perennial shrubs. Desert tortoises also rely heavily on intermittent rainfall to re-hydrate, and will emerge in numbers immediately following the onset of spring and summer rains to drink (Medica et al., 1982).

Desert tortoises are mature at approximately 15-20 years of age (Woodbury and Hardy, 1948). One to two (1-2) clutches of 2-14 eggs are laid during the spring or early summer in or near the females burrow (Miller, 1955; Turner et al., 1987). Eggs hatch in about 105-135 days (Coombs, 1977). Individual animals may live for over 100 years (Woodbury and Hardy, 1948).

Desert tortoise populations have declined in recent years as a consequence of several factors. Man-induced activities, including urbanization, highway construction, livestock grazing, motorized recreation, utility and pipeline corridors, mineral exploration and development, and energy development, have contributed to habitat loss and degradation (Berry, 1984). Populations have also suffered major declines as a result of disease outbreaks and excessive predation by ravens, a major predator of juvenile tortoises (~~US~~BLM et al., 1989).

American peregrine falcon: The American peregrine falcon is a large falcon, with narrow, pointed wings that extend to a total length of about 40 inches. Adults are bluish in coloration above and light-buff below. The head is very dark, with a "cap" that extends on both sides to well below the eyes. Peregrine falcons feed entirely on other birds that are caught in the air. The species suffered precipitous declines attributed principally to nest failure as a result of pesticide (e.g., DDT) effects (CDFG, 1991; BioSystems, 1991; BOR, 1996). The American peregrine falcon is currently listed as endangered by the State of California and the federal government.

Preferred habitat typically consists of cliff faces near optimal foraging habitat, usually close to rivers, lakes, or streams (BOR, 1996). Surveys of the lower Colorado River system during 1990 did not document nesting activities south of Lake Mohave; however, potential peregrine falcon nesting habitat exists in a narrow series of steeply rising bluffs bordering the lower portion of the Colorado River ~~along the lower portion of the Colorado River~~ in Topock Gorge and near Bill Williams delta (BOR, 1996). The Project area does not lie within the identified breeding range of the American peregrine falcon (BioSystems, 1991).

Golden eagle: The golden eagle favors mountainous and hilly terrain with open country for foraging. This large raptor can have a wingspan up to 6.5 feet and weigh as much as 14 pounds (BioSystems, 1989). Adult birds are mainly dark

brown, with immature birds showing some white plumage. All ages possess golden feathers on the head and shoulder region. This species feeds on a variety of mammals, snakes and other birds and carrion. Golden eagles nest in large trees, cliffs, escarpments and occasionally on transmission towers. Golden eagles are relatively rare in the Colorado Desert ~~and along the Colorado River, where they are infrequent winter visitors~~ (Garrett and Dunn, 1981).

Northern harrier: The northern harrier is distinguished by its owl-like facial disk and white rump patch. Males are generally gray above, white below with black wing tips, while females are brown above and white below with heavy brown streaking (National Geographic Society, 1987). Harriers usually fly very close to the ground when foraging for prey such as amphibians, reptiles, small birds and mammals. This species is most common in the vicinity of wetlands and agricultural areas, but can be observed in ~~open~~ sparsely vegetated areas and the desert while migrating. In the winter, this species can be observed along the Colorado River and in agricultural areas of the desert.

Miller and Stebbins (1964) record this species as an infrequent migrant in Joshua Tree National Park. Weathers (1983) also records it as a migrant in Deep Canyon, near Palm Springs. The species has also been reported from the Algodones Dunes, about fifteen (15) miles west of the Project area, between the months of January and April (BLM records).

Ferruginous hawk: The ferruginous hawk derives its common name from its rust-colored back and shoulder regions, that contrast sharply with its mainly white underparts. This is one of the largest hawks in the United States that favors open dry country. In southern California this species is a winter visitor, typically arriving in early fall and departing in early spring. Ferruginous hawks can be observed in the vicinity of grassland and agricultural areas in the desert, but are rather rare and uncommon near the Colorado River (Garrett and Dunn, 1981). Ferruginous hawks have been reported in the vicinity of the Coachella and All American Canals between the months of January and April (BLM records). This species is a California Species of Concern as a wintering bird in southern California.

Sharp-shinned hawk: The sharp-shinned hawk is a small raptor distinguished by its small size and square-tipped tail. Coloration on the back is charcoal to brownish, with a lighter colored breast mottled with reddish brown streaks or bars. The long tail is distinctly banded. It feeds on a variety of other birds, including juncos and warblers (Weathers, 1983). Geographic range for this species is extensive, and includes most of California.

Within the Colorado and Mojave Desert, sharp-shinned hawks are uncommon winter residents. Miller and Stebbins (1964) note occurrences of this species at Joshua Tree National Park between October and February. Weathers (1983) has noted it as an "uncommon migrant" in Deep Canyon near Palm Springs. It has also been recorded from eight (8) miles east of Picacho (about twenty (20) miles east of the Project area; BLM data).

Burrowing owl: -The burrowing owl is an owl of ~~open undeveloped country~~ sparsely vegetated habitats but also frequents golf courses, abandoned agricultural fields, road cuts and airports. Although nocturnal, it commonly perches conspicuously during daylight hours at the entrance to its burrow or on some low post. These small owls feed on insects, small birds, and mammals. Burrowing owls usually nest in single pairs or as small colonies, and utilize abandoned mammal burrows or rarely burrows that they construct for themselves for nesting and shelter. This species is common in the ~~Imperial Valley and in~~ agricultural areas of Imperial Valley and near the Colorado River (BioSystems, 1989). Burrowing owls are considered California Species of Concern~~ when nesting~~.

Cooper's hawk: The Cooper's hawk is an uncommon bird often associated with open woodlands. It is slightly larger in size than a sharp-shinned hawk and similarly colored, with a strongly barred and rounded tail. Food consists of a variety of birds and small mammals (Weathers, 1983). Weathers (1983) notes that Cooper's hawks are uncommon throughout the year in Deep Canyon, with numbers increasing during the winter months. Miller and Stebbins (1967) also record it as an uncommon winter visitor at Joshua Tree National Park, with park records between August and November. The species has been recorded from January in the Algodones Dunes, approximately twenty (20) miles southwest of the Project area (BLM records).

Long-eared owl: Long-eared owls are medium-sized owls, distinguished by long prominent feather "tufts." It is widely distributed across the Northern Hemisphere. The plumage is intricately patterned, with mottling of grey, black and white feathers dorsally and a series of brown and grey streaks and bars ventrally. Prey includes a variety of small nocturnal mammals. Miller and Stebbins (1964) record it as "rare" in Joshua Tree National Park. It has been reported from "Glamis Forest" in Township 13 South, Range 18 East, approximately twenty (20) miles west of the Project area (BLM data).

Prairie falcon: The prairie falcon is a large falcon, with a brownish dorsal coloration with a light breast stippled with brown and black. Wingspan is about 30 inches. Primary prey includes other birds, although small mammals may also be eaten. Nesting occurs typically on cliff edges, cliff faces, or in potholes on

precipitous slopes, usually at a height of 30 or more feet above ground level. The range of this species in the California deserts is extensive, and includes virtually the entire Colorado Desert. It is intolerant of disturbance during nesting, and nests may be abandoned as a result of human intrusion (BioSystems, 1989; Weathers, 1983).

Barn owl: The barn owl is a medium-size owl with a widespread distribution across the northern hemisphere. -Dorsal coloration is light brownish. Ventral coloration is off-white, with darker fine stippling. The face is distinctly "heart-shaped," with small dark eyes. Legs are distinct and long. Barn owls forage for mice from mine shafts and tunnels, natural caves and rock fissures, and abandoned buildings. Eggs are laid at approximately two (2)-day intervals, resulting in nests comprised of several young of differing size. Young fledge in about 60 days (Weathers, 1983). The distribution within the California deserts is extensive. Barn owls have been reported from agriculturally developed areas around El Centro, and from creosote bush scrub habitats in the Algodones Dunes area, approximately fifteen (15) miles west of the Project area (BLM data).

Loggerhead shrike: The loggerhead shrike is a species that can be found in both open or brushy country, from desert to coastal habitats. Loggerhead shrikes are strikingly marked grayish white and black birds with a conspicuous dark eye "mask." This bird is often observed perched on some form of "lookout" (e.g., tree limb, fence post, ocotillo, etc.), from which it will dive on prey. Prey, consisting of insects, reptiles and small mammals, is often impaled on some sharp object (e.g., thorns, barbed wire, etc.) and left for future consumption. The loggerhead shrike is ~~common in open areas~~ found in shrub habitats throughout California.

Arizona Bell's vireo: The Arizona Bell's vireo is a subspecies of Bell's vireo with isolated willow-mesquite habitat in California in the vicinity of Needles and the Laguna Dam along the Colorado River (CDFG, 1991). Plumage of this small species is grayish above and whitish below. The species is generally indistinct and hard to identify when not singing. Bell's vireo song is distinct among vireos. Prey consist of insects, spiders, and fruits. The subspecies is endangered in California due to loss of riparian habitat and the invasion of remaining habitat fragments by brown-headed cowbirds which parasitize this vireo's nests. A single Bell's vireo was observed in Tumco Wash, approximately ten (10) miles south of the Project mine and process area during a biological survey in 1992 (Western Resource Development, 1993).

Black-tailed gnatcatcher: The black-tailed gnatcatcher is blue-gray above, and grayish white below. The outer tail feathers are mostly black with some white

markings below. A common resident of the Colorado Desert, it is found in the catclaw acacia-smoke tree vegetation of the southeastern deserts. Prey consists of a variety of insect species. This species is a common resident along the Colorado River, but it tends to avoid agricultural areas and tamarisk groves (Garrett and Dunn, 1981). Its geographic range extends from southern Inyo County to the United States-Mexican border in the United States. The close association of this species with wash vegetation has been noted by Miller and Stebbins (1964) and by Weathers (1983).

LeConte's thrasher: LeConte's thrasher is a pale grayish-brown thrasher that is lighter in coloration than other thrasher species. Other distinguishing field marks include dark eyes, bill and tail. LeConte's thrashers prefer arid, sparsely vegetated habitats (e.g., desert washes and flats) in both the Mojave and Colorado Deserts of California. This bird is uncommon throughout most of its range. LeConte's thrasher is absent from the irrigated portions of the Imperial Valley and the Colorado River, but it breeds in drier habitats outside of these areas (Garrett and Dunn, 1981).

The LeConte's thrasher has been previously recorded from the general vicinity of the ~~project site~~ Project area (CNDDB records). Prior records include drainages in Sections 11 and 28 of Township 14 South, Range 20 East, located west of the ~~Imperial~~ Project ~~site~~ area (BLM data).

Gila woodpecker: The gila woodpecker is a large woodpecker with grayish-brown overall coloration. The back is barred with black and white. In flight, there is also a white patch on each wing, and the tail is barred with black and white. Principal food includes other bird eggs, vegetable and fruit material, and insects (CDFG, 1991).

Gila woodpeckers are cavity nesters that prefer mature cottonwood and willow trees within riparian habitats. Although originally ranging along the lower Colorado River in California, the species is currently restricted to isolated disjunct occurrences between Needles and Yuma. Currently, about 200 individual birds are known to occur in this area (CDFG, 1991). The gila woodpecker has been listed as endangered in California as a result of habitat loss and degradation and from nest competition with the introduced European starling (Sturnis vulgaris). General area records include eight (8) miles east of Picacho (twenty (20) miles east of the Project) and Blythe (35 miles northeast of the Project) (BLM data).

Crissal thrasher: The crissal thrasher is a medium-sized songbird, distinguished by its downward-curved bill and rusty-colored undertail. Overall coloration is brown. The species is closely associated with densely vegetated canyons and

desert washes (Robbins, 1996; Weathers, 1983). The crissal thrasher has been previously recorded from Indian Wash, where an estimated three (3) breeding pairs were recorded during June 1977 (CNDDB records).

Vaux's swift: The Vaux's swift is a small streamlined bird adapted for highly maneuverable flight. Coloration is charcoal above and pale gray and white below. This species migrates extensively. Vaux's swifts breed from southeastern Alaska south to central California, and in southern Mexico south to Panama (Niller and Stebbins, 1964). The nearest breeding areas to the Project area are in the Sierra Nevada of central California (Personal Communication - Peter Woodman). Vaux's swift appear in southern California as spring and fall migrants, typically flying in small groups of one (1) to as many as fifteen (15) individuals. Miller and Stebbins (1964) cite several records of small groups of migrating birds in Joshua Tree National Park during the months of April-May and again in September.

White-throated woodrat: The white-throated woodrat is a stocky-shaped medium-sized rodent, with a total length of about fifteen (15) inches. The body plan for this species is highly generalist. The tail, comprising about half of this length, is grayish above and white below. The belly is whitish. The dorsal coloration is grayish intermixed with dusky hairs. This subspecies is distinguished by all others by the throat region, where hairs are pure white to their roots (Ingles, 1965). The geographic distribution of the subspecies *venasta* of the white-throated woodrat ranges roughly from southwestern and west-central Arizona west into extreme southeastern California, to the vicinity of Borrego Springs (Hall, 1981). Associated habitats often include mesquite woodland (Ingles, 1965) and large patches of beavertail cactus (Williams 1986). Large quantities of dead trees enhance woodrat populations by providing nest material and cover (Personal Communication - Nancy Nicolai, BLM, 1996). ~~Localized~~ Local records include the vicinity of Glamis (fifteen (15) miles west of the Project area) and Pilot Knob (fifteen (15) miles south of the Project area).

Yuma puma: The Yuma puma is a narrowly-distributed light race of the mountain lion restricted to the lower Colorado River drainage. This is a large feline, with a total length of about six to eight (6-8) feet, including an approximately three (3)-foot long tail. General coloration on this race is very pale above and whitish below. Prey includes burro deer, rodents, and rabbits (Williams, 1986). Grinnell (1933) noted that they were associated with dense "bottomland" vegetation along the Colorado River and nearby rocky uplands. Very little is known about the population status of this race and its ecology. Records proximate to the Project area include twelve (12) miles north of Yuma (1903 record), twenty (20) miles north of Picacho (no date), and sightings from

the Imperial National Wildlife Refuge during the 1940's (Williams, 1986). The Project area lies near the western edge of the historical range of the Yuma puma. A contract survey conducted for the USFWS in the 1980's to collect recent possible sightings of the Yuma puma did not result in any new records. There are unconfirmed reports of mountain lions in the Picacho Recreation Area, principally reported to the CDFG by deerhunters (Personal Communication - Rusty McBride, CDFG, 1995). More recently, a critical review of the status of the Yuma puma was undertaken (McIvor, *et al*, 1994). Much confusion exists over the taxonomic status of the Yuma puma, as well as the viability of a population of mountain lions along the Lower Colorado River. ~~It is uncertain if the Yuma puma deserves its subspecific taxonomic status, and based~~ Based on available information, it was concluded that *Felis concolor brownii* does not deserve subspecific designation. Nevertheless, a population of mountain lions does exist along the Lower Colorado River, and the greatest threat to their survival appears to be loss of habitat, particularly riparian and wetland communities, as it relates to loss of prey species, especially deer herds. ~~There are unconfirmed reports of mountain lions in the Picacho Recreation Area, principally reported to the California Department of Fish and Game by deerhunters (Personal Communication - Rusty McBride, CDFG).~~

American badger: The American badger is widely distributed across the west-central Canada, the western United States, and northern Mexico. Habitats occupied include deserts, plains, foothills, and mountain valleys. The badger is characterized as a short, stout predator, with powerful forelegs and claws for digging out its rodent prey. Coloration is brownish or grayish dorsally, with a striking black-and-wide striping across the face. The ears are small and tail short (Ingles, 1965; Burt and Grossenheider, 1964). Overall length is about 28 inches, and weight about twenty (20) pounds. Messick (1987) cited studies documenting home ranges of American badgers of about 1,400 acres and 2,100 acres.

California leaf-nosed bat: The California leaf-nosed bat is a medium-sized species distinguished by its combination of large ears and vertical "leaf-like" projection on its nose. The species is distributed in southern California, extreme southern Nevada and western and southern Arizona (Burt and Grossenheider, 1964). It is closely associated with mine shafts and tunnels (Brown, 1989 and 1993). Leaf-nosed bats forage primarily along microphyll washes for their insect prey, that includes grasshoppers, beetles and moths. Brown (1992 and 1994) captured and telemetered California leaf-nosed bats during studies in the Cargo Muchacho Mountains, about five (5) miles south of the Project mine and process area. She noted that most foraging occurs within a one (1)-mile radius of the roost site, with forays to a five (5)-mile radius during warm months.

Greater western mastiff bat: The greater western mastiff bat is characterized by its free tail and comparatively large size from other bats in the Project area. Coloration is a deep brown. The geographic range of this species extends from central California south and east into northern Mexico (Burt and Grossenheider, 1964; Hall, 1981). Habitat for roosting consists of large cracks in exfoliating slabs of granite or sandstone that open downward, typically on cliffs (Williams, 1986). Williams (1986), overviewing the status of this species, mentions severe declines for largely unknown reasons.

Spotted bat: The spotted bat is a medium-sized species distinguished from other bats by the three (3) large distinctly patterned light spots on its torso and its large ears. The geographic range of this bat is very extensive, including central Montana, across the Great Basin, Mojave, Sonoran and Chihuahuan Deserts into central Mexico (Hall, 1981). Very little is known ~~on~~ of the life history of this species. Miller and Stebbins (1964) mention a record from Twentynine Palms. Brown (1992 and 1993), during surveys in the Cargo Muchacho Mountains, may have heard this species.

Townsend's big-eared bat: This is a medium-sized bat with extremely large ears joined across the forehead. Two prominent lumps are also present on the nose. Coloration is olive-brown (Burt and Grossenheider, 1964). The geographic range extends from over much of the western United States into central Mexico (Hall 1981). Known roosting sites in California include caves, mine tunnels, and abandoned buildings. Food consists of a variety of insects. The species is extremely intolerant of disturbance, and even a single visit into a roosting sites may cause these bats to abandon the site (Williams, 1986).

Yuma myotis: This is a small myotis characterized as having its interfermoral membrane haired almost to its knees. Coloration is brownish. It roosts in colonies in caves, tunnels and abandoned buildings in arid areas. The U.S. Bureau of Reclamation, overviewing its biology, mentions a close association with water (BOR, 1996). The geographic range extends from southwestern Canada across the western United States into northwestern Mexico (Hall, 1981).

Cave myotis: The cave myotis is a comparatively large bat identified by a wing membrane that extends to its toes. Coloration is dull brown (Burt and Grossenheider, 1964). Roost sites include caves, tunnels, mine shafts and under bridges (BOR, 1996). The geographic distribution of the cave myotis extends from the central Oklahoma area through most of Arizona and southwest Texas west into extreme southeastern California and south through most of Mexico (Hall, 1981). California records include the Riverside Mountains, 35 miles north of Blythe, and the vicinity of Needles (Hall, 1981). Brown (1995), evaluating the

possible use of the Project area by cave myotis, estimated a low potential for roosting and a medium potential for foraging.

Small-footed myotis: The small-footed myotis is one of the smallest bat species in the United States. It is distinguished by yellowish long silky fur and a black mask across the face. Roosting sites include caves, tunnels, rock crevices and forested areas (Burt and Grossenheider, 1964). The geographic range is extensive, and includes western Canada, south into the southwestern United States into northwestern Mexico (BOR, 1996).

Occult ~~myotis~~ little brown bat: The occult ~~myotis~~ little brown bat is a small bat species characterized by hairs on its back that have glossy tips, giving the pelage a glossy sheen. Roosting sites include caves, mine shafts and tunnels, hollow trees, and buildings (Burt and Grossenehider, 1964). The geographic range of this ~~race~~ subspecies of little brown bat extends from extreme southeastern California east into western New Mexico, then south into central Mexico (Hall, 1981). California records include Ripley, five (5) miles south of Blythe, and the Riverside Mountains (Hall, 1981).

~~Pallid~~ Desert pallid bat: The pallid bat is a medium-sized bat identified by its large ears and yellowish fur. Roosts include rock crevices, caves, mine tunnels, buildings and trees (Burt and Grossenheider, 1964). The geographic range of the *pallidus* ~~race~~ subspecies ranges from northern Utah and Colorado south into central Mexico and west into extreme southeastern California. California records include Indian Cove and Cottonwood Spring at Joshua Tree National Park (Miller and Stebbins, 1964).

3.5.6.2. Biological Survey Findings

~~A systematic~~ Systematic biological surveys ~~was~~ were conducted coincident with the botanical site surveys in July, August, and September 1994; and February, April and May 1995~~.~~ for the entire Project area, including the proposed Project mine and process area, access corridor, water well corridors, and alternate transmission line corridor, including buffer areas (Rado, 1995). A 120-foot wide corridor centered on the existing 34.5 kV transmission line which will be overbuilt was also surveyed along the entire length of the transmission line during August and September, 1994 (Rado, 1996). The biological survey also included collection of prior data for the area from other sources, including: the CNDDB for the Hedges and Ogilby USGS 7.5 minute quadrangles; discussion with Chemgold staff; and review of prior biological survey reports conducted in the general area (Turner et al., 1980; Environmental Solutions, 1987; Kiva Biological Consulting, 1991; Western Resource Development, 1993; WESCO,

1992; Office of Arid Land Studies; Karl, 1994; BLM, undated; and BLM, 1994b). Target species investigations were also conducted as part of the biological survey. Target species investigations included: supplemental bird surveys conducted within the Project ~~mine and process~~ area ~~and Indian Pass Road~~ in July 1994 and February, March, and April 1995; rodent live trapping conducted within the Project mine and process area in August 1994; and deer habitat evaluations conducted within and surrounding the Project ~~mine and process~~ area ~~and Indian Pass Road~~ in September 1994 (Rado, 1995) and July 1995 (Krausman, 1995). The observations and findings made during the biological surveys~~,~~ are provided in appendices to this EIS/EIR and are briefly summarized below.

Wildlife species and sign observed during site surveys included eighteen (18) reptiles, 44 birds, and sixteen (16) mammals. With the exception of the desert tortoise and chuckwalla, all reptile species are common, widely distributed, and lack special management status. Bird species observed included year-round residents, such as Gambel's quail (*Lophortyx gambelii*), as well as seasonal migrants, such as white crowned sparrows (*Zonotrichia leucophrys*) (Rado, 1995).

Mammals include a variety of rodents. Livetrapping results indicate that the dominant rodent species are the Merriam kangaroo rat (*Dipodomys merriami*) and the desert woodrat (*Neotoma lepida*). Larger mammals include such predators as ~~Kit~~ kit fox (*Vulpes macrotis*) and coyotes (*Canis latrans*). An active kit fox pupping den was observed within the Project mine and process area during the survey (Rado, 1995).

- Federal or State Listed Species:

Desert Tortoise: A single federally listed species, the desert tortoise (*Gopherus agassizii*), was observed throughout the Project ~~mine and process~~ area and along the surveyed ~~access and~~ transmission corridors. A total of 32 observations of live animals, 247 burrows and pallets, 103 scat, 2 nesting sites, and 14 carcasses were observed. For reasons which are not known, most of the individuals and sign were observed in the eastern half of the Project mine and process area (Rado, 1995). Based on site survey information, an estimated total of between 33~~-~~ and 57 animals are present (Rado, 1996).

Gila woodpecker: An adult gila woodpecker (*Melenerpes uropygialis*), a California-listed endangered species, was observed near the southwest corner of the Project mine and process area on January 12, 1995, by a biologist monitoring exploratory drilling. The individual woodpecker was originally perched on a

large ironwood tree in a large wash near the western border of the Project area. Additional searches for this and other gila woodpeckers, including using recorded bird calls in an effort to elicit a response, were negative. This single observation is believed to have consisted of a transient bird (Rado, 1995).

Flat-tailed horned lizard: Records indicate the occurrence of the flat-tailed horned lizard, a federal proposed-for-listing species, in the vicinity of the Project area. This species is associated with fine, sandy-based soils which are absent from the Project area. This species was not documented during site surveys (Rado, 1995). Favorable flat-tailed horned lizard habitat exists near the intersection of Ogilby Road and Interstate Highway 8 (Rado, 1995). Sand sheets, extending east from the Algodones Dunes ~~approximately two miles farther west from the intersection of these highways,~~ provide favorable flat-tailed horned lizard habitat. This sandy-based soil extends north for an approximate distance of one (1) mile from this intersection.

Except as previously discussed, a search of both federal and California threatened and endangered species lists, candidate lists, USFWS special status species lists, BLM sensitive species list and records, the CNDDB database, and other relevant listings and databases did not indicate the presence of any other federal or California listed or proposed wildlife species within the Project area.

- Other Special Status Wildlife Species:

Several ~~currently unlisted~~ wildlife species that are either USFWS Special Status Species, BLM Sensitive Species, and/or designated state Species of Special Concern were recorded during the site surveys. These species include the Chuckwalla (*Sauromalus obesus*), loggerhead shrike (*Lanius ludovicianus*), sharp-shinned hawk (*Falco striatus*), northern harrier (*Circus cyaneus*), and American badger (*Taxidea taxus*). ~~Although suitable colonial roosting sites are not available, one or more sensitive bat species may also forage in the area.~~

Chuckwalla: The surveyed lands were found to contain only marginal chuckwalla habitat. A total of three (3) chuckwallas were observed during surveys of the Project area. All were associated with fractured rocks, where small rock crevices afforded thermal cover and concealment. Although about half of the Project mine and process area is comprised of rocky substrates, larger rock outcrops and associated crevices that constitute optimal chuckwalla habitat are absent from the ~~project~~ Project area (Rado, 1995).

White-throated woodrat: The white-throated woodrat was not documented during surveys of the Project area, which included livetrapping and release for small

mammals (Rado, 1995). ~~Suitable microhabitats dominated by clumps of mesquite and large clumps of beavertail cacti are not present on the Project site (Rado, 1995).~~ The potential for occurrence of this species in the Project area is low (Personal Communication - Nancy Nicolai, BLM, 1996).

~~Desert bighorn sheep: Krausman (1995) evaluated the Project area with respect to bighorn sheep that may range in the vicinity. It was concluded that the Project area and immediate vicinity are not in, or adjacent to, bighorn sheep habitat, and there is no evidence that the Project area is in a corridor between bighorn habitat (Krausman, 1995). This analysis is also supported by biologists who evaluated southeastern Imperial County for bighorn on behalf of the CDFG (Weaver and Mensch, 1968). They concluded that the area encompassing the proposed Project area was not bighorn seasonal or permanent range. No dispersal corridors that would be used to travel between mountain ranges by bighorn were identified (Weaver and Mench, 1968). Bighorn occur in the hills and mountain slopes several miles east of the Project area, including Picacho Peak to the east of the Project mine and process area, and Peter Kane Mountain. A single radio-telemetered ram, originally recorded from the Peter Kane Mountain area, was documented at the extreme southern end of the Cargo Muchacho Mountains, about five miles southeast of the Imperial Project site (Personal Communication - Rusty McBride, CDFG). The specific route this ram travelled to arrive in the Cargo Muchacho Mountains is not known. There is some speculation that the bighorn would likely have travelled along the ridge extending through Indian Pass from Black Mountain toward Picacho Peak (Personal Communication - Nancy Andrew, CDFG).~~

Yuma Puma: The Yuma puma, if present in this area, would use the site for hunting deer, a principal prey species. No natural rock shelters or man-made caves or adits that could be used by mountain lions for refuge or concealment are present within the Project area. The biological survey completed by Rado (1995) concluded that the Project area contains a potential prey base population of deer for mountain lions. However, no mountain lion observations, nor any sign of mountain lions (e.g., tracks), were recorded during the biological surveys of the Project area (Rado, 1995).

American badger: American badgers utilize the Imperial Project area for hunting. A single live badger was observed in a large wash approximately one (1) mile north of the project site in September 1994. Additional badger-excavated rodent burrows were observed in the northern portion of the Project area during transect surveys. The entire Imperial Project site is probably used by low numbers of badgers for foraging (Rado, 1995).

Loggerhead shrike: Loggerhead shrikes were frequently observed during transect surveys. —Observations included two family groups, strongly indicating that both foraging and nesting occurs within the Project mine and process area (Rado 1995).

Crissal thrasher: A single crissal thrasher was observed during surveys of the Project area. The species is closely associated with drainages and wash "edge" vegetation. Based on the presence of wash channels in the area, the species may both forage and breed within the Project area (Rado, 1996).

Vaux's swift: Vaux's swift was observed flying over the Project area during the spring bird surveys. The species would be expected to utilize the general area, including the Project area, during spring and fall migration, but the species does not nest in this region (Rado, 1996).

Arizona Bell's vireo: No Arizona Bell's vireo were observed within the Project area during the biological surveys. Based on the complete absence of habitat for this species, it would not be expected to be encountered within the Project area (Rado, 1996).

Black-tailed gnatcatcher: Black-tailed gnatcatchers were often observed during surveys of the Project area. The species was most frequently observed in secondary drainages, typically less than twenty (20) feet in width, where young ironwood and palo verde trees provide cover (Rado, 1995). This species most likely breeds in the Project area (Personal Communication - Nancy Nicolai, BLM, 1996).

LeConte's thrasher: No LeConte's thrashers were observed during surveys of the Project area. Surveys for this species were intensive, and included the use of tape-recorded calls to elicit responses from birds during the breeding season (Rado, 1995).

- Raptors:

  Non-resident raptors and other bird species are expected to seasonally forage in, or migrate through, the Project area. Migrants and other non-resident species would more likely utilize the area as winter range than during other seasons. No raptor nests have been observed within the Project area or within adjacent areas (Rado, 1995). Raptors observed consist of low numbers of individual birds that utilize the Project area for foraging.

Northern harrier: A total of two (2) northern harrier observations were made during the surveys. Both observations occurred in September and consisted of a single animal foraging over the western portion of the Project area. Based on these findings, the northern harrier appears to seasonally utilize the Project area for foraging (Rado, 1995).

Sharp-shinned hawk: A single sharp-shinned hawk was observed in the northwestern portion of the Project area during September. This single bird was observed foraging in the largest ephemeral stream channel system along the western edge of the Project mine and process area. No additional observations were made. Based on this single observation, the species appears to infrequently forage in the larger ephemeral stream channels which transect the Project area (Rado, 1995). The sharp-shinned hawk probably occurs throughout the area as a seasonal winter migrant. Low numbers of birds may utilize the general area, including the Imperial Project site, for foraging during winter months.

Peregrine falcon: Surveys of the Project area did not document the occurrence of the American peregrine falcon (Rado, 1995 and 1996). The species has also not been recorded during prior inventories of this area (BLM records; DeDycker and Associates, 1994; Condor Minerals Management, 1991). The steeply walled canyons and cliffs favored by this species for nesting are absent from the Project area and surrounding area. Additionally, the Project area is not proximate to wetland habitats also favored by peregrine falcons for foraging.

Golden eagle: Surveys of the Project area did not document the occurrence of any golden eagles (Rado, 1995). The golden eagle could infrequently utilize the general area, including the ~~Imperial~~ Project area, for foraging during winter months.

Ferruginous hawk: No ferruginous hawks were observed during surveys of the Project area (Rado, 1995). The ferruginous hawk could infrequently utilize the general area, including the Project area, for foraging during winter months.

Burrowing owl: No burrowing owls ~~have been~~ were observed during surveys of the Project area (Rado, 1995). The burrowing owl may utilize the general area, including the Project area, for foraging.

Cooper's hawk: No Cooper's hawks were observed during surveys of the Project area (Rado, 1995). However, low numbers of birds may utilize the general area, including the Project area, for foraging during winter months.

Long-eared owl: No long-eared owls were recorded during surveys of the Project area (Rado, 1995). Potential nesting habitat occurs in the Project area (Personal Communication - Nancy Nicolai, BLM, 1996). The long-eared owl may ~~utilize~~ occur in the general area, including the Project area, for foraging.

Prairie falcon: No prairie falcons were observed during site biological surveys (Rado, 1995). Prairie falcons may utilize the general area, including the Project area, for foraging. There are no potential nesting sites for prairie falcons within the Project mine and process area.

Barn owl: No barn owls were observed during site biological surveys, but no owl surveys were conducted. ~~However, they~~ Barn owls may utilize the general area, including the Project area, for foraging (Rado, 1995).

- Bat Species:

No sensitive bat species ~~were recorded during the biological surveys, nor have sensitive bat species~~ have been previously documented within the Project area. ~~In addition, conditions~~ Conditions generally suitable for breeding and roosting were not observed within the Project area. However, individual colonial bats may roost in the palo verde or ironwood trees within the Project area, or may utilize the few small rock crevices found within the Project area. Although suitable colonial roosting sites are not available, one or more sensitive bat species may also forage in the area. Several sensitive species of bats are known to inhabit areas of the Cargo Muchacho Mountains, approximately six (6) miles southeast of the Project area. Surveys of the American Girl Mining Project site (BLM, 1994b) have documented the occurrence of the California leaf-nosed bat (*Macrotus californicus*), Townsend's big-eared bat (*Plecotus townsendii*), and Western mastiff bat (*Eumops perotis*). Two other sensitive bat species, the Spotted bat (*Euderma maculatum*) and the Cave myotis (*Myotis velifer*), may also have been heard during these surveys of the American Girl Mining Project site. Each of these species may utilize the ~~Imperial~~ Project area for foraging (Brown, 1995).

A focused assessment of the -Project area with respect to bat habitat and occurrences was conducted contemporaneous with the biological survey by a third-party consulting biologist (Brown, 1995). This assessment, which is provided as Appendix H, concludes that, as no mine adits, caves, or large rock crevices exist in the Project area, the sensitive bat species, including the Townsend's big-eared bat, western mastiff bat, and spotted bat, would not day-roost in the Project area, but they could forage in the Project area at night.

Desert washes are the prime type of foraging habitat of the California leaf-nosed bat. Leaf-nosed bat populations have been documented in the Cargo Muchacho and eastern Chocolate Mountains. The leaf-nosed bat usually forage within five (5) miles of their roosts in warm months. During summer months they may roost at night between foraging flights in trees in the washes, but in colder months they return to mines for night roosting. As no mines exist in the Project area, the leaf-nosed bat would not roost in the area during the day, but could roost in the trees in the Project area at night between foraging bouts. The nearest known diurnal roost to the Project area is a mine adit approximately 4.5 miles south in the Cargo Muchacho Mountains. However, since the distance of the nearest diurnal roost to the Project area approaches the foraging range of the bat, Brown (1995) concluded that, unless a leaf-nosed bat diurnal roost is discovered closer to the Project area, the Project area is probably not regularly visited by the leaf-nosed bat. Other bats, including most *Myotis* species and bats of the *Tadarida* and *Eumops* genera, forage farther from their roosting areas than the leaf-nosed bat~~,~~ and, thus, may forage in the Project area.

The USFWS Special Status or California Species of Concern (CSC) bats which could possibly roost on, or forage over, the Project area are identified in Table 3-9~~:~~.

Table 3-9: USFWS Special Status Species and California Species of Concern Bat Species Which Could Roost On, or Forage Over, the Imperial Project Area

Common Name	Scientific Name	Status	Roost	Forage
Yuma myotis	*Myotis yumanensis*	USFWS	Low	Medium
Small-footed myotis	*Myotis ciliolabrum*	USFWS	Medium	Medium
Cave myotis	*Myotis velifer*	USFWS/CSC	Low	Medium
Occult~~-myotis~~ little brown bat	*Myotis lucifugus occultus*	USFWS/CSC	Low	Medium
~~Pallid~~ Desert pallid bat	*Antrozous pallidus*	CSC	Medium	Medium
Townsend's big-eared bat	*Plecotus townsendii*	USFWS/CSC	None	Low
Spotted bat	*Euderma maculatum*	USFWS/CSC	None	Low
Western mastiff	*Eumops perotis*	USFWS/CSC	None	High
California leaf-nosed bat	*Macrotus californicus*	USFWS/CSC	None	Low

Source: Brown, 1995

- Game Species:

  Several species of game birds are present within the Project area, including Gambel's quail, mourning dove (*Zenaida macroura*) and white-winged dove (*Zenaida asiatica*), which were observed in the moderate-to-larger ephemeral stream channels (Rado, 1995). These hunted species are common residents or migrants in the area (see Section 3.9.2.3).

  Mule deer: Mule deer are widely distributed throughout the Project area and surrounding vicinity. Based upon a survey of the ephemeral stream channel system, it was found that the channels are regularly used by deer, with principal movements occurring at night (Rado, 1995). Deer sign (i.e., tracks and/or scat) were observed in all major channels within the Project mine and process area, and those extending one (1) or more miles from the Project mine and process area boundaries. The microphyll woodlands typical of these channels apparently serve as movement corridors for the deer. However, fresh deer tracks and scat were also regularly observed on the interspersed desert pavement, showing that deer are dispersed and move freely about cross-country between drainages. No permanent water sources are present within the boundaries of the Project mine and process area which would serve to concentrate deer; however, a CDFG-managed "guzzler" constructed to provide a water source for deer is located off of Hyduke Road, approximately two (2) miles south-southwest of the Project mine and process area. This water source is believed to contribute to the observed east-west movement of deer through the Project area, at approximate right angles to the washes. Subsequent to the biological field surveys, two (2) new "guzzlers" were reported to have been constructed by the CDFG approximately 0.8 miles and 1.5 miles, respectively, from the eastern boundary of the Project mine and process area in September 1995 (Personal Communication - Ted Rado, 1995). Approximate locations of the "guzzlers" with respect to the Project mine and process area are shown on Figure 3-12.

  A focused evaluation of the Project area with respect to deer was conducted contemporaneous with the biological survey by a third-party consulting biologist (Krausman, 1995). This evaluation, which is provided as Appendix I, included reviewing reports of previous deer investigations in the area, reviewing potentially applicable deer herd management plans, communicating with other consulting biologists and agency biologists, and an inspection of the Project area in July 1995. The evaluation concludes that there is some ambiguity as to whether or not the desert deer in the Project area are a subspecies of deer called the "burro" deer (*Odocoileus hemionus eremicus*), which some have reported to differ from desert mule deer (*Odocoileus hemionus crooki*) based on physical differences in the deer. However, more recent investigations suggests there may be no difference in the

mitochondrial DNA haplotype of the "burro" deer to distinguish it from other mule deer populations. Whether the deer in the area are "burro" deer or desert mule deer, their ecology is reported to be similar and habitat components include washes (ephemeral stream channels) with dense vegetation, rolling to steep topography, and water availability. Fawning typically occurs in low, broken hills with vegetated washes near water (Celentano and Garcia, 1984).

The Krausman evaluation reports that in late summer the deer move away from the Colorado River to the desert mountains, and in the late spring they return to the river. Migration routes follow major desert wash systems, and the ephemeral stream channels in the Project area are used by deer as evidenced by tracks and pellets. However, steep topography does not exist within the boundaries of the Project mine and process area, nor does a water source. Krausman states that the literature indicates "... the area in and around the Imperial Project is used by deer moving across the desert flats from mountain foothills to water sources or other important habitat components." Krausman noted that by comparison, in the Belmont Mountains of Arizona, mule deer were more probably limited by forage availability than by any other factor, including water availability, and that the Belmont Mountain forage area provided more vegetation than the desert flats provide around the Project area. Based on these observations, Krausman concluded that the ~~Imperial~~ Project area is not consistent with habitat used to support a resident deer herd or as important deer fawning habitat. These findings appear to conflict with unpublished information provided by the CDFG indicating that the microphyll woodland in the major washes within the Project area and vicinity provide deer fawning habitat and support numbers of deer (Personal Communication - Rusty McBride, CDFG, 1995).

The CDFG has prepared a deer herd management plan for the deer population inhabiting southeastern San Bernardino, Riverside, and Imperial Counties (Celentano and Garcia, 1984). Deer densities within the general area were reported to average approximately 0.2 animals per square mile (Celentano and Garcia, 1984 after McLean, 1940). However, because of low density and scattered distribution, an accurate estimation of the desert deer herd population is difficult. CDFG records of hunter success in the area have trended upwards since the 1940's, suggesting the deer herd density in the area may be increasing (see Section 3.9.2.3). Deer move seasonally in order to take advantage of water supplies and forage. Principal use of areas removed from the Colorado River takes place during the fall and winter. Fawning typically occurs in the late summer or early fall, within habitats characterized by broken hills and interconnecting washes within one (1) mile of a dependable water source (Celentano and Garcia, 1984). The CDFG is especially concerned about the

cumulative loss of microphyll woodland habitat utilized by deer and other species (Personal Communication - Nancy Andrew, CDFG, 1996).

Desert bighorn sheep: Krausman (1995) evaluated the Project area with respect to bighorn sheep that may range in the vicinity. It was concluded that the Project area and immediate vicinity are not in, or adjacent to, bighorn sheep habitat, and there is no evidence that the Project area is in a corridor between bighorn habitat (Krausman, 1995). This analysis is also supported by biologists who evaluated southeastern Imperial County for bighorn sheep on behalf of the CDFG (Weaver and Mensch, 1968). They concluded that the area encompassing the proposed Project area was not bighorn seasonal or permanent range. No dispersal corridors that would be used to travel between mountain ranges by bighorn were identified (Weaver and Mench, 1968). Bighorn sheep occur in the hills and mountain slopes several miles east of the Project area, including Picacho Peak to the east of the Project mine and process area, and Peter Kane Mountain. A single radio-telemetered ram, originally recorded from the Peter Kane Mountain area, was subsequently documented at the extreme northern end of the Cargo Muchacho Mountains, about five (5) miles southeast of the Project mine and process area (Personal Communication - Rusty McBride, CDFG, 1995). The specific route this ram travelled to arrive in the Cargo Muchacho Mountains is not known. There is some speculation that the bighorn would likely have travelled along the ridge extending through Indian Pass from Black Mountain toward Picacho Peak (Personal Communication - Nancy Andrew, CDFG, 1996).

3.6. Cultural and Paleontological Resources

3.6.1. Regulatory Framework

Historic properties or cultural resources are places or objects that are important for scientific, historic, or religious reasons to cultures, communities, groups, or individuals. 36 CFR Part 800 defines historic properties as "any prehistoric or historic district, site, building, structure, or object included in the National Register [of Historic Places]." Section 106 of the National Historic Preservation Act (Public Law 89-665; 80 Stat 915; U.S.C. 470, as amended) requires a federal agency with jurisdiction over a project to take into account the effect of the project on properties included in or eligible for the National Register of Historic Places (NRHP), and to afford the Advisory Council on Historic Preservation a reasonable opportunity to comment.

3.6.2. Cultural Resources

The following discussions of the cultural history (ethnohistory) of the Project area and the cultural resources identified within the surveyed Project area are briefly summarized from the July, 1996 and September, 1996 cultural resources inventory reports prepared for the Project survey area (ASM Affiliates, Inc., 1996a; ASM Affiliates, Inc., 1996b). More complete discussions of these topics can be found in the non-confidential portions of ~~this~~ these reports, which ~~is~~ are reproduced in Appendix J of this EIS/EIR.

3.6.2.1. Cultural History

Six (6) cultural periods, each with distinctive cultural patterns, may be defined for the Colorado Desert, extending back in time to a period of at least 12,000 years before present (BP). These periods are: (1) Early Man (Malpais) Pattern - 50,000 to 12,000 years BP; (2) PaleoIndian Period (San Dieguito) - 12,000 to 7,000 years BP; (3) Archaic Period (Pinto and Amargosa) - 7,000 to 1,000 years BP; (4) Late Prehistoric Period (Patayan) - 1,500 to 450 years BP; (5) Ethnohistoric Yuman - 450 years BP to present; and (6) Historic Euro-American - 450 years BP to present.

Of the prehistoric cultural materials identified within the Project area, most are likely to belong to the PaleoIndian, Late Prehistoric, or Ethnohistoric Yuman Periods. Some resources from the Historic Euro-American time period were also discovered (~~See~~ see Section 3.6.2.3).

The area in and around the Project was heavily used by pre-contact Native Americans as a travel route and as a source for tool-grade lithics. There are no large habitation sites in the immediate area; however, the Project is proximate to both Indian Pass and Indian Pass Wash, which were natural travel corridors through which substantial foot traffic traveled from the area of the Colorado River to the inland desert areas. Indian Pass ACEC, located about three-quarters (3/4) of a mile north of the Project mine and process area (see Figure 3-12), was specifically designated to protect cultural resources in the form of prehistoric artifacts located in Indian Pass and the adjacent Chocolate Mountains. Because the natural desert pavement of the Project area contains a wide variety of rocks of generally cobble size, which vary in quality for the making of lithic tools from poor to good, the Project area was also subject to substantial "prospecting" for quality lithic materials by the Native Americans who were otherwise traveling through the area. This is evidenced by the numerous "chipping stations" located in the Project area, where potential source materials for lithic tools were tested and, if found promising, were crudely shaped on site then carried away for later

finishing off site. Some wide-ranging foraging activities are also evidenced from the cleared circles and rock rings that may represent short-term encampment.

3.6.2.2. Native American Values

The American Indian Religious Freedom Act (AIRFA) and the Executive Order of April 24, 1995 require~~s~~ that local Native American groups be consulted regarding any proposed projects which may affect traditional religious practices. The BLM has issued internal guidelines which instruct that this consultation should be initiated early in the project review or decision-making process, and be conducted at the highest levels within the BLM jurisdiction responsible for the decision. BLM has initiated this consultation process with the Quechan Tribe ~~Nation~~ regarding the Project, and Quechan Tribe ~~Nation~~ has requested that members be involved in study and development of the treatment plan for the Project. The consultation process is ongoing as of the publication date of this EIS/EIR.

In addition to this consultation process, a third-party ethnographic study based upon consultation with the Quechan Tribe has recently been initiated to assist the BLM, in part, with the identification of contemporary Native American concerns and values associated with the Project area; document current Native American knowledge about the function and/or interpretation of available resources; and record the meaning and significance of resources to Native Americans today. The study also seeks to identify mitigation measures that Native Americans believe would be appropriate to minimize Project-related impacts to sensitive cultural resources, and assist the BLM in its significance evaluation of sites and their eligibility for the NRHP (see also Section 4.1.6.1).

3.6.2.3. Survey Results

An intensive Class III pedestrian survey and cultural resources inventory of the survey area (the Project area and additional buffer areas~~, but not including that portion of Indian Pass Road at its junction with Ogilby Road or the route of the existing 34.5 kV transmission line which is to be overbuilt with the 92 kV transmission line~~) was conducted by ASM Affiliates, Inc. (ASM Affiliates, Inc., 1996a) (see also Appendix J-1). A total of 2,212 acres were included in the area surveyed: 1,648 acres occupying the mine and process area and ancillary area (less the 335 acres which had been previously surveyed at the same level), as well as an additional 564 acres of buffer area adjacent to these areas. This intensive survey was conducted to inventory the cultural resources within the survey area and to evaluate these resources for NRHP eligibility.

The cultural resources identified within the survey area are limited to prehistoric and historic archaeological properties, including isolated resources. Altogether, 49 sites were recorded. Many of the sites included several features. Prehistoric features consist of a total of 194 prehistoric chipping stations; ten (10) trail segments associated with two (2) trail shrines and four (4) pot drops (totaling 35 pot ~~shards~~ sherds); eleven (11) cleared circles; three (3) rock rings; three (3) geoglyphs; and one (1) possible milling slick were recorded within the survey area. Documented historic features were the probable historic use of some of the prehistoric trail segments and four (4) separately defined sites consisting of historic rock features and trash scatters from a World War II-period encampment associated with the Desert Training Center/California-Arizona Maneuver Area.

Preliminary evaluations of these resources by the field investigators for significance under certain criteria for eligibility for the NRHP (see Section 4.1.6.1) ~~is~~ are also presented in Appendix J-1. The field investigators have determined that the prehistoric trail segments and associated features, all of the geoglyphs, all of the ceramic scatters, the chipping stations~~,~~ (when taken together as a whole), and one (1) rock ring site are likely significant resources potentially eligible for the NRHP. The cleared circles, other rock ring sites, and possible milling element were judged likely not significant and not eligible for the NRHP. The probable historic use of historic trails in the area was also judged significant and the trails eligible for the NRHP. The World War II bivouac sites in the region were judged to not be eligible for the NRHP, consistent with previous determinations by the BLM.

A records search and intensive Class III pedestrian cultural resources survey and inventory was also conducted of that portion of Indian Pass Road from its junction with Ogilby Road to the intersection with the existing IID 34.5 kV transmission line, and the entire route of the IID 34.5 kV transmission line which is to be overbuilt with the 92 kV transmission line, including buffer zones (ASM Affiliates, Inc., 1996b) (see also Appendix J-2). A total of approximately seventeen (17) linear miles were surveyed, some of which had been previously included in other cultural resource surveys.

The cultural resources identified by the records search and survey within the survey area included sixteen (16) sites and two (2) isolates. Four (4) of the previously recorded sites could not be relocated due to either subsequent disturbance or insufficient location data recorded on site records. The inventory included four (4) geoglyph sites with associated trails and artifact scatters, seven (7) prehistoric and historic trail segments, one (1) lithic scatter, one (1) ceramic scatter, one (1) historic mining site, and two (2) recent historic rock alignments. Two (2) isolated chert flakes were also recorded.

Preliminary evaluations of these resources for significance under criteria for eligibility for the NRHP (see Section 4.1.6.1) are also presented in Appendix J-2. The field investigators have determined that the four (4) geoglyphs, two (2) of the trails, and the historic mining site are likely significant resources potentially eligible for the NRHP. One (1) trail and one (1) ceramic scatter that could not be relocated were evaluated as indeterminate. The remaining seven (7) sites and two (2) isolates were judged likely not significant and not eligible for the NRHP.

Additional preliminary determinations for NRHP-eligibility will require completion of the ethnographic study and the ongoing consultation between the BLM and the Quechan Tribe (see Section 3.6.2.2). Actual eligibility for the NRHP will be determined by consultation between the California State Historic Preservation Officer (SHPO) and the BLM based on the eligibility criteria discussed in Section 4.1.6.1.

3.6.3. Paleontological Resources

No paleontological resources have been identified within the Project area, and none are expected to be found. This is primarily because the metamorphic and igneous origin of the basement rock units found on the site essentially preclude paleontological resources in these units. Similarly, the cemented alluvial material overlying the site is too young to contain significant paleontological resources, and was deposited in such a high energy environment that it would not be expected to contain such resources.

3.7. Visual Resources

3.7.1. Regulatory Framework

Scenic quality is a measure of the visual appeal of a parcel of land. Section 102(a)(8) of the Federal Land Policy and Management Act of 1976 (FLPMA) placed an emphasis on the protection on the quality of scenic resources on public lands. Section 101(b) of the National Environmental Policy Act (NEPA) of 1969 required that measures be taken to ensure that aesthetically pleasing surroundings be retained for all Americans.

To ensure that these objectives are met, the BLM devised the Visual Resource Management (VRM) System. The VRM System provides a means to identify visual values; establish objectives for managing these values; and provide information to evaluate the visual effects of proposed projects. The inventory of visual values combines evaluations of scenic quality, sensitivity levels, and distance zones to establish visual resource inventory classes, which are "informational in nature and

provide the basis for considering visual values in the [land use planning process]. They do not establish management direction and should not be used as a basis for constraining or limiting surface disturbing activities." (U.S. Bureau of Land Management, 1986b).

Visual resource management classes are assigned to public land units through the use of the visual resource inventory classes in the BLM's land use planning process. One (1) of four (4) visual resource management classes is assigned to each unit of public lands. The specific objectives of each of the visual resource management classes are presented in Table 3-10.

Table 3-10: BLM Visual Resource Management Classes

Class	Description
I	The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.
II	The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant nature features of the characteristic landscape.
III	The objective of this class is to partially retain the existing character of the landscape. The level of change to the character should be moderate. Management activities may attract attention, but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.
IV	The objective of this class is to provide for management activities which require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. Management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic element.

Source: US BLM, 1986b

The Project area is located within the California Desert Conservation Area (CDCA), which was created by FLPMA in recognition of the unique management requirements of the California Desert (see Section 3.9.1). The BLM's CDCA Plan has assigned one (1) of four (4) multiple use class designations to each unit of BLM-administered public lands within the CDCA. In the CDCA, visual resource management objectives are based upon the guidelines associated with each of the

multiple use classes. The Project area has been designated as Class L - Limited Use, which is equivalent to CDCA visual resource management Class II.

3.7.2. Existing Visual Resources

The Project area landscape consists of a series of gently rolling ridgelines and upland areas interspersed with a series of slightly incised subparallel ephemeral drainage channels which all gently slope from north-northeast to south-southwest at approximately one (1) percent. The Project area is relatively undisturbed, with only a few roads and trails and minor disturbances from historic and ongoing mineral exploration activities. The upland areas support a sparse creosote bush scrub plant community, dominated by creosote bush (*Larrea tridentata*), ocotillo (*Fouquieria splendens*), and small numbers of desert shrubs and forbs. The ephemeral stream channels and the areas adjacent are dominated by a sparse community of desert ironwood (*Olneya tesota*), palo verde (*Cercidium floridum*), cat claw (*Acacia greggii*), burrowbush (*Ambrosia dumosa*), brittle-bush (*Encelia farinosa*), also with a few other desert shrubs and forbs. Much of the upland areas are covered by well-developed desert pavement of gravel- to cobble-size rocks.

The landscape color consists principally of browns, tans, and grays, while vegetation colors are generally browns, greens, yellows, and tans. Because of the sparse vegetation cover, the existing landscape colors meld with vegetation colors from distant points.

The visual resources of the Project area were evaluated using the methods outlined in Section 8431 - Visual Resource Contrast Rating of the BLM VRM Manual (U.S. Bureau of Land Management, 1986a). The contrast rating system is a planning and design guide which is used to assess the degree to which a proposed project contrasts with the existing visual character of the project area. It is used to identify visual impacts of proposed management activities and to identify mitigation measures which can be taken to reduce the identified visual impacts resulting from discordant project features (U.S. Bureau of Land Management, 1986a).

Contrast ratings for the Project area were determined from three (3) viewing locations, known as Key Observation Points (KOPs), which were selected as representative of the possible views of the Project area. The selected KOPs were: from Ogilby Road, at the 45 degree turn to the northwest located approximately five (5) miles southwest of the Project mine and process area (KOP #1); from a point near the electronic stations atop Black Mountain, approximately six (6) miles northwest of the Project mine and process area (KOP #2); and from a hilltop just south of Indian Pass in the Picacho Wilderness Area, approximately two (2) miles northeast of the Project mine and process area (KOP #3) (see Figure 3-14). The

Figure 3-14: Location of Key Observation Points for Visual Evaluations

visual contrast rating for each of the KOPs was completed using the Visual Contrast Rating Worksheet (Bureau Form 8400-4). The completed worksheets are attached as Appendix K.

Portions of the Project mine and process area are potentially visible from a short section of Ogilby Road, at the point where the road turns to the northwest approximately five (5) miles southwest of the Project mine and process area (KOP #1). Views of the Project mine and process area from other portions of Ogilby Road are blocked, either by slightly elevated topography or by dense vegetation located adjacent to the road. Persons viewing the Project mine and process area from this point, KOP #1, would currently view a landscape which has flat form and an undulating line in the middleground and a rhomboid form and angular to jagged line in the background (see Figure 4-1). The middleground texture is smooth with a tan to gray color. The background texture is smooth to rough with a brown to tan color.

The entire Project area is visible from elevated vantage points on Black Mountain, approximately six (6) miles to the northwest of the Project mine and process area. Persons viewing the Project mine and process area from the southern end of the top of Black Mountain (KOP #2) would currently see a landscape which has a flat, smooth to simple form and a flowing to weak line in the middleground, and a steep, smooth to simple form and geometric to soft line in the nearground (see Figure 4-3). The middleground texture is stripped to directional with a gray to brown color. The nearground texture is granular to patchy with a black to brown color.

The entire Project area is also visible from the most elevated vantage points within the recently created Picacho Wilderness Area, including the hilltop immediately south of Indian Pass and Indian Pass Road, approximately two (2) miles northeast of the Project mine and process area. Persons viewing the Project mine and process area from this point (KOP #3) would view a landscape which has a flat, smooth to minor rolling form and an undulating to irregular line (see Figure 4-5). The texture is granular, sparse to patchy with a tan, brown to black color.

3.8. Noise

3.8.1. Regulatory Framework

The Noise Element of the Imperial County General Plan provides a program for incorporating noise issues into the land use and planning process, with a goal of minimizing adverse noise impacts to sensitive noise receptors. The Noise Element establishes goals, objectives and procedures to protect the public from noise intrusion. The Noise Element for Imperial County is applicable to lands owned or zoned by the county. Lands regulated by the state or federal government, such as those

~~**Figure 3-15**: Current View of the Project Mine and Process Area from Ogilby Road (KOP #1)~~

~~**Figure 3-16**: Current View of the Project Mine and Process Area from Black Mountain (KOP #2)~~

~~Figure 3-17: Current View of the Project Mine and Process Area from a Hilltop Near Indian Pass in the Picacho Wilderness (KOP #3)~~

incorporated by the Proposed Action, however, are preempted from local land use policy (County of Imperial, 1993e).

Noise is a form of energy that is generally described as unwanted sound. Noise levels, or sound pressure levels, are typically measured in units of A-weighted decibels [dB(A)] using a logarithmic scale which "frequency-weights" sounds within the audible range to approximate human hearing. Human hearing typically encompasses the sound range from approximately 5 dB(A) at the quietest end to approximately 140 dB(A), where pain is produced in most listeners.

3.8.2. Existing Noise Levels

Ambient noise level measurements for the Project area are not available. However, ambient noise levels in the Project area and vicinity are assumed low and typical of isolated desert areas (i.e., 35 to 50 dBA), except as may be modified by those noise generating activities in the Project area and vicinity, including:

- Traffic traversing Indian Pass Road through the Project area;
- Infrequent and intermittent military aircraft maneuvers and military weapons explosions associated with the use of the Chocolate Mountain Aerial Gunnery Range (CMAGR), located to the northwest of the Project area;
- Infrequent military aircraft overflights associated with Visual Flight -Rule (VFR) corridors located above and adjacent to the Project area;
- Military helicopter use of the Project area as a training ground for the use of night vision -devices;
- Noise associated with dispersed recreational activities, including: OHV, hunting, and camping uses of the Project area and vicinity;
- Mineral exploration, including drilling by Chemgold under existing BLM approvals; and
- Natural sources, such as wind, rain, thunder, and wildlife.

Sensitive noise receptors are, in general, those areas of human habitation or substantial use where the intrusion of noise has the potential to adversely impact the occupancy, use, or enjoyment of the environment. These can include residences, schools, hospitals, parks, and places of business requiring low levels of noise. Since the Project area is situated in a very remote area, there are no such typical sensitive

human receptors in or anywhere near the Project area. However, sensitive noise receptors may also be defined to include potentially noise-sensitive wildlife, which may currently be present in or near the Project area (see Section 3.5.6). The boundaries of two (2) wilderness areas are also located within one and one-half (1½) miles of the Project mine and process area (see Figure 3-12 and Section 3.9.2.1).

3.9. Land Use

3.9.1. Regulatory Framework

Plans and policies applicable to the Project area include:

- The Imperial County General Plan
- Imperial County Zoning Regulations
- BLM California Desert Conservation Area (CDCA) Plan

The state-mandated Imperial County General Plan (General Plan) was developed to create a balanced, comprehensive guide for future physical growth of lands within the County, and provides mechanisms to achieve the County's desired goals and objectives (-County of Imperial, 1993e). The General Plan strives towards achieving a balance between development and economic, social, and environmental resources. The General Plan consists of nine (9) elements: Land Use, Housing, Circulation and Scenic Highways, Noise, Seismic and Public Safety, Agriculture, Conservation and Open Space, Geothermal and Transmission Resources, and Water Resources (-County of Imperial, 1993e).

A Land Use Map is provided as part of the Land Use Element of the General Plan which depicts projected land use development patterns within Imperial County. The Land Use Plan indicates that the Project area is located within a large expanse of land currently dedicated to open space/recreation uses.

The Conservation and Open Space Element of the Plan is concerned with mineral resources, open space and other environmental resources. The purpose of the Conservation and Open Space Element of the General Plan is to:

- Promote the protection, maintenance, and County's natural resources with particular emphasis on scarce resources and resources that require special control and management;

- Prevent the wasteful exploitation, destruction, and neglect of the State's natural resources;

- Recognize that natural resources must be maintained for their ecological value as well as for the direct benefit to the public; and

- Protect open space for the preservation of natural resources, the managed production of resources, outdoor recreation, and public health and safety.

Imperial County zoning and other land use regulations are designed to promote land use compatibility by designating acceptable uses and activities within identified areas or zones. Zoning regulations promote or prohibit uses, and designate appropriate building classes or structures within the various zones which are, in part, intended to prevent or inhibit conflicting or incompatible growth or uses within the respective zones. The Project area is currently zoned "S-Open Space."

The Project area is located entirely on public land administered by the BLM. As Imperial County has no direct land use jurisdiction over public lands, neither the General Plan nor the Imperial County zoning regulations are directly applicable to proposed activities on public lands. However, the Imperial County Planning ~~and~~ /Building Department is the CEQA Lead Agency for the Project, and has the ability to adopt and require implementation of reasonable environmental mitigation measures for projects proposed on public lands.

In 1976, Congress enacted the Federal Land Policy and Management Act (FLPMA) and established the 25 million acre California Desert Conservation Area (CDCA). The CDCA Plan is a comprehensive, long range plan for the management, use, development, and protection of the 12 million acres of public land within the boundaries of the CDCA which are administered by the BLM. The CDCA Plan was adopted in 1980, and has been subsequently amended on a periodic basis. The goal of the CDCA Plan is to provide and enhance uses for public lands without diminishing the environmental, cultural, and aesthetic values of these lands (USDI, 1980).

The Project area is located entirely within the CDCA. The majority of the public lands within the CDCA have been designated under a multiple use classification system. Four (4) multiple use classes have been established: Class C (Controlled Use); Class L (Limited Use); Class M (Moderate Use); and Class I (Intensive Use). Specific guidelines have been established for each recognized activity in each multiple use class. The Project area is located entirely in an area designated Class L, or Limited Use. Class L areas are intended to generally protect sensitive, natural, scenic, ecological, and cultural resources, and are typically managed to provide for generally lower-intensive, controlled, multiple use of resources, while ensuring that sensitive resources are not significantly reduced. Mineral exploration and development projects are allowed in Class L areas.

3.9.2. Existing Land Uses

The entire Project area is located within a remote area of eastern Imperial County on undeveloped public lands administered by the BLM. Current land uses in the area consist of mineral exploration and development, aerial military training overflights, and dispersed recreational activities by the general public. Similar public lands with similar uses generally surround the Project area. The nearest residence to the Project mine and process area is Gold Rock Ranch, which is located approximately seven (7) miles southwest of the Project mine and process area. No other permanent residences are known to exist within ten (10) miles of the Project area.

Several operating mines are located in the vicinity of the Project area. The American Girl/Oro Cruz Mine is located about seven (7) miles south of the Project area; the Mesquite Mine is located about ten (10) miles to the northwest of the Project area; and the Picacho Mine is located about eight (8) miles east of the Project area.

The U.S. Marine Corps (USMC) maintains the Chocolate Mountain Aerial Gunnery Range (CMAGR), which at its closest is approximately ten (10) miles northwest of the Project area. The CMAGR is actively used for military aircraft training and live ordnance delivery. The USMC conducts both daytime and nighttime helicopter flight training in and around the Project area, and two (2) military visual flight rule (VFR), low-level flying routes for fixed wing aircraft are located in the vicinity of the Project area (Personal Communication - T. Manfredi, June 2, 1995).

The BLM is currently drafting a long-term regional management plan which will include the Project area. The plan, entitled "Northern and Eastern Colorado Desert Coordinated Management Plan" (NECDEMP), will address a broad spectrum of land uses which include mineral exploration and development as well as protection of biological resources. Plan decisions will involve only state and federal lands and will provide the basis for the BLM to amend its 1980 California Desert Conservation Area Plan (CDCA) and the cooperating agencies to update their land and resource management plans. An overview and progress report on the plan was published in July 1995 and addresses those comments received during the public scoping period. The progress report states that the scoping process has been completed and that a draft plan is anticipated for spring of 1996 (USDI, 1995a).

3.9.2.1. Wilderness Areas

The Wilderness Act of 1964 established the National Wilderness Preservation System which is comprised of public and other federal lands designated by Congress as wilderness. The California Desert Protection Act of 1994 gave wilderness designation to 69 individual areas of public land within the CDCA.

Two (2) Wilderness Study Areas (WSAs) in the vicinity of the Project area, Picacho Peak (CDCA 355A) and Indian Pass (CDCA 355), were designated as wilderness areas (USDI, 1995b) (see Figure 3-12). The Picacho Peak Wilderness Area encompasses a total of approximately 7,700 acres, and is located approximately three-quarters (3/4) of a mile northeast of the Project mine and process area at its nearest point (USDI, 1994). (There is currently some question regarding the correct location of the southern boundary of the Picacho Wilderness Area. The boundary shown on Figure 3-12 is that taken from USDI, 1994. The boundary marked in the field is further south by as much as 1,000 feet.) The Indian Pass Wilderness Area encompasses a total of approximately 33,855 acres within the Chocolate Mountains, and is located approximately one and one-half (1½) miles north of the Project area at its closest point. The southern boundary of the Indian Pass Wilderness Area is generally separated from the northern boundary of the Picacho Peak Wilderness Area by Indian Pass Road, which provides access to both of the wilderness areas from the southwest (USDI, 1994). ~~There is also currently some question~~

3.9.2.2. Areas of Critical Environmental Concern

FLPMA defines Areas of Critical Environmental Concern (ACEC) as ~~those areas~~ an area within public lands where special management attention is required to protect and prevent irreparable damage to important historic, cultural, or scenic values; fish and wildlife resources; other natural systems or processes; or to protect human life and safety from natural hazards (USDI, 1980). ACECs are typically not managed for multiple use, but they do not preclude appropriate development if protection of sensitive values can be assured.

The Project area is not located within any designated ACEC. The nearest ACEC is the Indian Pass ACEC, located about three-quarters (3/4) of a mile north of the Project area (see Figure 3-12). The Indian Pass ACEC was designated to protect cultural resources in the form of prehistoric artifacts located in the Chocolate Mountains approximately four (4) miles southeast of Quartz Peak. The only other ACEC located in the vicinity of the Project area is the ~~Golden Basin Rand Intaglios~~ Singer Geoglyphs, located about ten (10) miles west-northwest of the Project area. This ACEC was also nominated to protect cultural resources in the form of a number of intaglios located within that area.

3.9.2.3. Recreation Resources

Numerous dispersed recreational opportunities exist in the vicinity of the Project area. These uses include: hunting, camping, hiking, picnicking, rock collecting, photography, off-road vehicle use, and off-highway vehicle use. The

nearest developed recreational facilities include the private Gold Rock Ranch, a small campground facility with a general store located approximately seven (7) miles southwest of the Project mine and process area, and the Picacho State Recreational Area, located about six (6) miles northeast of the Project mine and process area along the Colorado River.

Indian Pass Road serves as the primary access route to the new Indian Pass and Picacho Wilderness Areas. The wilderness areas are likely to attract campers, rock collectors, and sightseers. Indian Pass Road also serves as a secondary route to the Picacho State Recreation Area, located approximately four (4) miles east-northeast of the Project mine and process area, and it forms a loop with Picacho Road circling back south to Interstate 8.

No site-specific records are available with respect to the volume of camping or other dispersed recreational activities which may be undertaken in the immediate vicinity of the Project mine and process area. No improved campsites or facilities exist in the immediate area, but old fire rings and indirect evidence of primitive campsites were observed at a few locations along the wash west of Indian Pass Road between its intersection with Ogilby Road and the Project mine and process area. It is presumed that the heaviest volume of visitors in the area would occur during hunting seasons and in the winter months when temperatures are more moderate and recreational vehicle and "snowbird" visitation generally increases in the region.

The Imperial Sand Dunes Recreation Area (ISDRA) is located approximately ten (10) miles west of the Project area in the Algodones Sand Dunes. The area south of State Route 78 is used for camping and off-highway vehicles (OHV), while the area north of State Route 78 is reserved for more passive recreational uses. The Imperial Sand Dunes Recreation Area is perhaps the most well known landmark in Imperial County and attracts thousands of off-road vehicle (ORV) enthusiasts each year. The dunes extend for more than 40 miles along the eastern edge of the Imperial Valley and average approximately five (5) miles in width.

The D-12 deer hunt zone, which encompasses over 7,000 square miles in the eastern portions of San Bernardino, Riverside and Imperial Counties, including the Project area, has long been recognized by local hunters as providing valued desert deer hunting opportunities (Celentano, R.R. and J.R. Garcia, 1984). In recent years, hunting interest has increased, bringing additional pressures on the local deer population (Davis, J. and B. Schaefer, 1995). The estimated total population of deer in the D-12 zone is 1,700 (CDFG, 1996); however, total deer population in the area is difficult to estimate and data is particularly expensive to obtain due to the low density and scattered distribution of the deer. As such, the

herd size is typically discussed in relative terms based on climatic conditions, plant productivity, herd composition, and harvest data (Celentano and Garcia, 1984). The CDFG recently compared the following methods for collecting deer data in the Sonoran desert: (a) helicopter surveys, (b) ground surveys, and (c) hunter interviews. It was concluded that each of the three (3) methodologies provided generally comparable findings with respect to estimating the frequency of male, female, and juvenile mule deer within the survey area (Thompson and Bleich, 1993). Based, in part, on these findings, the CDFG is currently using hunter surveys to provide demographic information about deer in the D-12 zone. Hunter survey data for the D-12 deer hunt zone has now been collected for two (2) years (i.e., the 1994 and 1995 hunting seasons) (Personal Communication - Nancy Andrew, CDFG, 1996).

~~A total of 34,736 deer were estimated to have been killed by hunters statewide in California in 1995. This estimate includes both the deer take reported by hunters (17,273) and the estimated average statewide nonreporting of 49 percent.~~ The reported deer taken in the D-12 zone in 1995 was 60 deer (CDFG, 1996). ~~An~~ Using the estimated statewide average nonreporting of 49 percent, an additional 60± nonreported deer were probably also taken, for an estimated total of about 120 deer harvested within the D-12 zone. The Project area is located in Area IV of the D-12 zone (an area south of State Route 78 extending to the U.S.-Mexico border, and from the Colorado River west to the Imperial Valley). According to the two (2) recent deer hunter surveys compiled by the CDFG, a total of three (3) bucks were taken by the 26 hunters responding to the survey who hunted in Area IV during the 1994 season (approximately a 12 percent success rate); and a total of twelve (12) bucks were taken by the 29 hunters responding to the survey who hunted in Area IV in 1995 (about a 41 percent success rate). These survey numbers can be compared to the average hunter success rates statewide and the entire D-12 zone, including Area IV, over the past six (6) years (~~See~~ see Table 3-11). The CDFG expects to issue 1,100 deer tags for the 1996 hunt in the D-12 zone.

Table 3-11: Summary of Reported Deer Hunter Success Rates for Years 1990 - 1995

Area	Hunter Success Rates by Percent by Year					
	1990	1991	1992	1993	1994	1995
Statewide	14	12	12	10	11	8
D-12 Deer Hunt Zone	3	6	6	7	6	6

Source: (CDFG, 1996)

It is unclear from the information available if the reported higher relative success rate of hunters in Area IV is a result of an increasing population of deer resulting from consecutive years of favorable conditions (see Section 3.5.5), or other factors such as continuing increased ORV use and hunting pressure, as suggested by Celentano and Garcia (1984) to reflect the increased deer kill trend observed within the D-12 zone over the years 1945 to 1984.

Game birds, including Gambel's quail, mourning dove, and white-winged dove, inhabit the washes in the Project area. Relatively little statistical information is available regarding small game in the area, but it is reported that some hunters from the Imperial Valley favor hunting game birds in the desert washes over hunting these species within the Valley proper (Personal Communication - Carol Sassie, CDFG, 1996).

3.10. Socioeconomics

The Proposed ~~Imperial~~ Project would have an influence on the socioeconomic environment of both Imperial County, California and Yuma County, Arizona. Pertinent socioeconomic data and background data for both Yuma and Imperial Counties is summarized below.

3.10.1. Imperial County, California

Imperial County occupies an area of 4,284 square miles in the southeastern corner of California. It is bounded on the north by Riverside County, on the west by San Diego County, on the south by Mexico, and on the east by the Colorado River and Yuma County, Arizona.

3.10.1.1. Demographics

The Project area lies within a sparsely populated, unincorporated area of Imperial County. According to demographic statistics available from the State of California Department of Finance, Demographic Research Unit, Imperial County had a total population of 135,675 as of January 1, 1994 (California Department of Finance, 1994).

The significant population centers located within California nearest the Project area are the City of Holtville, located approximately 50 road miles to the southwest; the City of Brawley, located approximately 56 road miles to the west-northwest; and the City of El Centro, located approximately 60 road miles to the southwest of the Project mine and process area. The estimated 1994

population for the cities of Holtville, Brawley, and El Centro were 5,576; 21,738; and 36,717; respectively (California Department of Finance, 1994).

3.10.1.2. Housing

According to estimates based upon the 1990 U.S. Census, Imperial County was projected to have 40,366 households by 1994. The estimated number of persons per household in 1994 was projected to be 3.48 (California Department of Finance, 1994).

3.10.1.3. Employment and Income

The labor force for Imperial County in 1994 was estimated by the State of California Economic Development Department to be 48,825. Per capita income in 1990 was estimated at $15,343 for residents of Imperial County. Median family income for 1990 was estimated at $25,147. ~~Families classified as living in poverty in Imperial County during this time constituted 23.8 percent of the 1990 population. This represented the highest poverty rate for any county within the State of California.~~

The local economy of Imperial County is based principally on agriculture, government services, and retail trade. According to 1990 estimates, 35.1 percent of the county's work force was employed in agriculture, 21.3 percent was employed in government services, and 15.2 percent were employed in retail trade. Unemployment rates were estimated at 19.3 percent of the total work force of Imperial County in 1994.

3.10.2. Yuma County, Arizona

Yuma County occupies 5,509 square miles, and is situated in the far southwest corner of Arizona. Yuma County is bounded on the west by the Colorado River and Imperial County, California, on the north by La Paz County, on the east by Maricopa and Pima Counties, and on the south by Mexico. The City of Yuma is the county seat.

3.10.2.1. Demographics

Yuma County was projected to have a population of 120,827 in 1995 (Yuma Economic Development Corporation, 1994). The City of Yuma in Yuma County, Arizona, approximately 30 road miles southeast of the Project area, is the nearest significant population center to the ~~Imperial~~ Project area. The 1993 population of

the City was estimated to be 57,730 (Yuma Economic Development Corporation, 1994).

3.10.2.2. Housing

Yuma County was estimated to have 35,791 occupied housing units in 1990 (Arizona Public Service Company, Economic Development Department, and Azstats, 1994). For the same period, the estimated number of persons per household was 2.9 (Yuma Economic Development Corporation, 1994).

3.10.2.3. Employment and Income

The 1993 work force for Yuma County was estimated to be 45,300. The estimated 1992 per capita income for Yuma County was $12,504, and the 1990 median family income was estimated at $25,648 (Arizona Public Service Company, Economic Development Department, and Azstats, 1994).

Yuma County's leading employers are agriculture, government, and tourism. The largest employers in Yuma County are the U.S. Marine Air Corps Station and Yuma Proving Grounds (Yuma Economic Development Corporation, 1994). The estimated 1992 unemployment rate for Yuma County was 22.8 percent (Arizona Public Service Company, Economic Development Department, and Azstats, 1994).

3.11. Roads~~, Utilities~~ and Public Services

3.11.1. Roads and Transportation System

Although the Project area is located in a relatively remote section of Imperial County, the existing road system provides direct access from the west. The Project mine and process area is located along Indian Pass Road, approximately six (6) miles northeast of the intersection of Indian Pass Road with Ogilby Road. Main access to Indian Pass Road and the Project area is via Ogilby Road, either from the south, approximately thirteen (13) miles from the Ogilby Road exit off Interstate 8, or from the north, approximately eleven (11) miles from the intersection of Ogilby Road with State Route 78 (see Figure 3-14).

Indian Pass Road is an approximately 24-foot-wide, graded gravel road which provides access to Indian Pass and the southern Chocolate Mountains, and the recently created Indian Pass and Picacho Wilderness Areas, for campers, rockhounds, sightseers, and OHVs. Indian Pass Road is maintained by the Imperial County Department of Public Works (ICDPW), Road District No. 5, Holtville, under the

general right-of-way granted by federal Revised Statute 2477 (R.S. 2477) on July 26, 1866, for public highways across public lands which were not otherwise reserved for any use. FLPMA rescinded R.S. 2477 in 1976, but no right-of-way under the FLPMA right-of-way regulations (43 CFR 2800) has been requested by Imperial County or granted by the BLM.

Hyduke Road is an approximately 15-foot-wide dirt road which extends from Ogilby Road to the Colorado River in the east. It provides access to the recently created Picacho Wilderness Area and to the Picacho State Recreation Area Headquarters located along the western shoreline of the Colorado River and is used by campers, rockhounds, sightseers, and OHVs. Hyduke Road is maintained by the ICDPW also under the general right-of-way granted by federal R.S. 2477, without a FLPMA right-of-way.

Both Indian Pass Road and Hyduke Road have been included in the BLM's National Backcountry Byways program. This program is the BLM's contribution to the larger National Scenic Byways program, which is intended to increase the awareness of scenic corridors that are "off the beaten path" (USDI, no date).

Ogilby Road (County Road S-34) is a two-lane, paved county road also maintained by the ICDPW. State Route 78, a paved two-lane state highway, and Interstate Highway 8, a four-lane interstate highway, are both maintained by District 11 of the California Department of Transportation (Caltrans).

Traffic volume counts [average weekday vehicle trip ends (AWVTE)] were taken in 1993 on several roads in the vicinity of the Project area, although no traffic volume counts on Ogilby Road in the vicinity of Indian Pass Road, or on Indian Pass Road itself, were taken. The available counts are given in Table 3-12.

Table 3-12: Traffic Volume Counts on Roads in the Vicinity of the Project Area

Location	AWVTE
Interstate 8 between Gordon's Well Road and Ogilby Road	10,000
Interstate 8 between Pilot Knob Road and Ogilby Road	10,300
Ogilby Road just south of its crossing of the Southern Pacific railroad tracks	928
State Route 78 between Glamis Road and Ogilby Road	1,500
State Route 78 at Palo Verde Ave. in Palo Verde	1,550

Source: Neil Jorgensen, Personal Communication, ICDPW, November 1995

All public lands are classified within one (1) of three (3) vehicle use categories: open, closed, or limited (USDI, Desert Access Guide No. 21, Midway Well). The Project area and surrounding area are designated as Limited Use Areas. Limited Use Areas are those areas which are available for motorized vehicle use subject to certain restrictions. Within Limited Use Areas, routes of travel are further designated as either open, closed, or limited. Vehicle access within Limited Use Areas are restricted to open and limited approved routes of travel. Figure 2-6 shows the routes of travel within the Project area and vicinity and the use designation assigned to each vehicle route (USDI, Desert Access Guide No. 21, Midway Well).

The main line of the Southern Pacific Railroad operates in the vicinity of the Project area, and crosses Ogilby Road at a point approximately nine (9) miles south of the intersection with Indian Pass Road and approximately 3.7 miles north of Interstate Highway 8. The Ogilby Road railroad track crossing is secured with standard crossing gates with flashing lights and warning bells (~~Neil Jorgensen,~~Personal Communication~~,~~ - Neil Jorgensen, ICPWD, November 1995).

3.11.2. Utilities

The Project area lies within the service area of the Imperial Irrigation District (IID), a state-chartered municipal utility which provides electrical energy to nearly all of the residential, commercial, and industrial users within Imperial County and southeastern Riverside County. The IID service line nearest the Project area is a 34.5 kV transmission/distribution line which crosses Indian Pass Road just north of its intersection with Ogilby Road (see Figure 3-12). This transmission line transmits power from the higher voltage IID transmission lines in the south to the electronic equipment located atop Black Mountain. The IID has indicated that this 34.5 kV transmission line has insufficient capacity to supply the electrical requirements of the Project (see Section 2.3.1.4). A Western Area Power Authority (WAPA) 161 kV transmission line runs parallel and adjacent to the IID 34.5 kV transmission line; however, WAPA has determined that it could not provide the Project with "firm," or non-discretionary, capacity to transmit the power from this transmission line.

Because of its strong agricultural base, Imperial County's economy is tied to the availability of inexpensive water. Most agricultural and potable water for use in Imperial County is supplied from the Colorado River by the IID via the All-American Canal. However, due to its remoteness, there is no public water service available to the Project area from the IID or others. Potable and process water for other projects located in the vicinity of the Project area -is typically obtained from private wells.

Sewer district's are located in most of the cities and unincorporated population centers of Imperial County and Yuma, although no sewer district covers the Project

area. Sanitary waste treatment for areas not within a sewer district is typically handled by individual on-site septic tanks and leaching systems in accordance with Imperial County Health Department regulations.

Natural gas is available in many parts of Imperial County and Yuma County; however, there are no gas lines in the vicinity of the Project area, and natural gas service is thus not available. However, propane supplied from individual tanks is readily available from several suppliers in Imperial County and Yuma County.

Telephone service is not currently available to the Project site. The operating mines in the vicinity of the project either have telephone service from Pacific Bell, or operate an on-site microwave telephone system.

As of 1993, there were ten (10) Imperial County-operated Class III disposal sites located throughout Imperial County which were authorized to accept non-hazardous solid waste (County of Imperial, 1993e). Three (3) of these landfills were located on land owned by Imperial County; six (6) were operated by Imperial County on public lands managed by the BLM; and one (1) was located on the ~~Quechan-~~Fort Yuma Indian Reservation~~-reservation~~. In addition to these facilities, one (1) privately operated public Class III waste disposal site was located in an unincorporated area northwest of the City of Imperial; one (1) privately operated public Class I landfill facility authorized to accept specific hazardous wastes was located west of the City of Westmorland; and one (1) private Class II solid waste disposal/storage facility authorized to accept~~ed~~ designated waste was located northwest of the City of Westmorland (County of Imperial, 1993e).

3.11.3. Public Services

Police service for the Project area is provided by the Imperial County Sheriff's Department, which maintains a substation in Winterhaven, California, an unincorporated community located across the Colorado River from the City of Yuma, Arizona, and approximately 28 road miles from the Project mine and process area. Fire service for the Project area is provided by the Winterhaven Fire Department.

The nearest hospital to the Project area is the Yuma Regional Medical Center, located within the City of Yuma, Arizona, a distance of approximately 30 road miles from the Project mine and process area. The El Centro Regional Medical Center is located approximately 60 road miles from the Project mine and process area.

Imperial County's education system consists of eighteen (18) school districts which contain 37 elementary schools, seven (7) high schools, six (6) adult schools, one (1) community college (Imperial Valley College) and one (1) satellite campus of

San Diego State University (County of Imperial, 1993e). Yuma County contains 24 elementary schools, four (4) high schools, four (4) private and parochial schools, and one (1) community college (Arizona Western College). Public school enrollment in Yuma County is approximately 24,250 students. An additional 500 students are enrolled in private and parochial schools (Yuma Economic Development Corporation, 1994).

3.12. Other Resources

The Project area is not in or adjacent to any of the following: (a) an area of prime or unique farmland; (b) a floodplain, as mapped by the Federal Emergency Management Agency (FEMA); or (c) a designated wild, scenic, or recreational river.

4. ENVIRONMENTAL CONSEQUENCES AND MITIGATION MEASURES

4.1. Proposed Action

4.1.1. Geology and Mineral Resources

4.1.1.1. Assumptions and Assessment Guidelines

The Proposed Action would normally have a significant effect on the environment if it would:

- Expose people or structures to major geologic hazards; or
- Substantially restrict the future ability to utilize mineral resources.

4.1.1.2. Impacts of the Proposed Action

Seismicity:

Seismic review of regional faults (active and potentially active) has indicated maximum credible earthquake magnitudes of 5.8 to 7.5 (see Table 4-1). However, because of the distance from each of these faults to the Project mine and process area; the nature of the underlying geologic units; and the depth to ground water; regional seismicity is not expected to cause significant horizontal accelerations or extensive ground shaking within the Project area.

Table 4-1: Summary of Maximum Probable Seismic Events and Effects

Fault or Fault Zone	Distance and Direction from Project Area (miles/direction)	Maximum Probable Magnitude	Effects at Project Area	
			Maximum Probable Peak Acceleration (g)[a]	Duration of Strong Ground Shaking (seconds)
East Mesa	29/West	6.0	0.17	18
East Highline Canal Lineament	32/West	6.0	0.09	18
Imperial/Brawley	42/Southwest	6.8	0.07	24
Brawley Seismic Zone	44/West	5.8	0.04	18
Superstition Hills	55/West	7.0	0.05	30
San Andreas	63/Northwest	7.5	0.04	36
Elsinore	77/Southwest	7.0	0.03	30

[a]Source: Joyner and Fumal, 1986 (Source: Environmental Solutions, Inc., 1993b.)

The proposed slope configurations for the leach pad ore heap (2H:1V, including benches) ~~is~~ are similar to those used at nearby mining operations, at which no significant slumping or slope failure has occurred. Stability analyses completed for the planned heaps (WESTEC, Inc., 1995) also indicate that the proposed slope of the heap would be stable and unlikely to produce significant failures, either under normal operating conditions or from ground shaking during a regional seismic event. Experience at nearby mines indicates that the proposed final pit wall slope of 1H:1.2V (50 degrees), constructed in cemented alluvium/gravels and metamorphic rock, would provide the required factor of safety for long-term slope stability, including the vibrations from blasting and ground shaking from anticipated seismic events in the region. The proposed pit wall design includes safety benches at regular vertical intervals to contain minor rock falls. The waste rock stockpile slope configurations would also be similar to those used at the Picacho Mine, and no significant slumping or slope failure is anticipated; however, an actual slope stability study has not yet been completed.

Project structures would be designed and constructed subject to the current Uniform Building Code (UBC) Seismic Zone 4 standards, which are the most stringent in the UBC. Implementation of Seismic Zone 4 standards would conform to the current Building Code Requirements of the Imperial County

Planning~~and~~/Building Department, and prevent catastrophic failure of facilities which could endanger human life during seismic events. Therefore, impacts from remote seismic events would not be significant.

No surface ruptures are anticipated from seismic activity because there are no known or currently identified active faults within the Project area. Mining of the proposed pits would not be expected to affect either the physical geology of known faults in the region or regional seismicity.

Loss of Mineral Potential:

Condemnation drilling by Chemgold geologists has been used to determine the limits of the gold ore bodies within the Project mine and process area. The results of this drilling, to date, indicate that valuable mineral resources common to the Project area do not exist in the areas of the proposed heap pad, waste rock stockpiles, and the process and ancillary facilities. Therefore, no potentially valuable mineralization would be buried by the placement of these facilities in these areas.

Backfilling of the West Pit would not result in the burial, and thus loss, of future, potentially valuable economic mineral resources since the mineralization has been structurally offset and downdropped well below the current limits of the mine plan. Since the East Pit and Singer Pit would not be completely backfilled, access to any future potentially economic mineralization below the limits of the current mine plan would not be completely lost.

Subsidence:

No land surface subsidence due to the extraction of ground water from the ground water production wells is expected. Generally, land surface subsidence related to ground water extraction occurs only when the drawdown of the ground water table is large or results in a substantial pressure reduction in a confined aquifer; or a substantial percentage of the earth materials forming the aquifer are fine-grained (silts or clays); or the depth from the surface of the land to the water table is small. Because the amount of ground water the Project proposes to extract is not large compared to the size of the aquifer or the amount of water in storage; because the sediments in the ground water production area are relatively coarse alluvial materials; and because the depth to ground water is greater than 500 feet below ground surface (bgs), measurable subsidence is not expected to occur as a result of the production of ground water. In addition, any subsidence which may occur would not be

located so as to be able to adversely affect any of the Project facilities. The distribution transmission lines needed to provide power to the ground water well pumps can tolerate localized subsidence. There are no other existing or planned developments or natural features in the immediate vicinity of the ground water production wells which could be adversely affected by localized subsidence.

Radioactivity:

Materials to be mined by the Project have not been analyzed for naturally occurring radioactive materials (NORM). However, some analyses from the general area for radon gas and uranium and thorium in soils have been conducted and can be used as an indication of the relative amount of NORM in the Project mine and process area. In 1990 the California Department of Health Services (DHS) conducted an initial phase radon survey by placing short-term radon detectors in approximately 2,858 randomly selected homes (DHS, 1990). Two samples were collected from homes in the Brawley area of Imperial Valley, the results of which indicated radon isotope-222 levels of 1.8 and 1.1 picocuries per liter (pCi/l) of air. These values are significantly below the USEPA recommended level of 4.0 pCi/l at which action should be taken to reduce radon levels. The mining of the proposed West Pit, Singer Pit, and East Pit is not expected to significantly increase the release of naturally occurring radon gas into the atmosphere.

Within an approximately fifteen (15)-mile radius of the Project mine and process area, approximately 37 soil samples were collected as part of the national uranium resource evaluation (NURE) (Hoffman, et al, 1991). The uranium values from these soil samples range from 2.2 to 4.4 ppm, and average 3.0 ppm. The average crustal abundance of uranium is 2.5 ppm (Rose, et al, 1979). The thorium values from the same soil samples range from 4.0 to 21.0 ppm, and average 10.67 ppm. The average crustal abundance of thorium is 10 ppm. In the immediate vicinity of the Project area, two (2) soil samples were collected. The uranium values from these two (2) soil samples are 2.2 and 3.0 ppm, which produce an average of 2.6 ppm. The thorium values from the same two (2) soil samples were 5.0 and 16.0 ppm, which produces an average of 10.5 ppm. Using the radon values in comparison to the USEPA recommended action level, and the uranium and thorium values in comparison to the average crustal abundance of those elements, neither the Project area nor the vicinity appears to have elevated levels of radioactive elements and, therefore, elevated NORM levels would not likely be expected to be produced by operations within the Project mine and process area.

4.1.1.3. Mitigation Measures

Incorporated by Project Design:

- 4.1.1-1: Heap leach pad and waste rock stockpile slopes shall be constructed at overall slopes no steeper than 2H:1V.

- 4.1.1-2: Mine pit slopes shall be constructed at overall slopes no steeper than 1H:1.2V (50 degrees) unless mining conditions and geotechnical factors demonstrate through engineering analysis that steeper slopes would be safe, and such steeper slopes shall be approved by the BLM. Slopes shall not be steeper than is safe considering actual rock strength and structural conditions encountered.

- 4.1.1-3: Approximately 40-foot wide benches ~~Benches~~ shall be constructed at approximately 80-foot high ~~appropriate~~ intervals on mine pit slopes to catch loose rocks. Approval shall be obtained from the BLM prior to construction of mine pit benches which differ substantially from these specifications.

Incorporated by Regulation:

- 4.1.1-4: Project structures subject to the Uniform Building Code shall be designed and constructed consistent with the standards of Seismic Zone 4.

Incorporated to Avoid Potentially Significant Impacts:

- 4.1.1-~~4~~5: To avoid any significant slumping or slope failure of the waste rock stockpile slopes, a slope stability analysis of the proposed waste rock stockpile slope configurations shall be conducted prior to the placement of waste rock on the stockpile, and the results of any study should be followed during the construction of the waste rock stockpile.

No other mitigation measures are proposed or recommended.

4.1.1.4. Unavoidable Adverse Effects and Level of Significance After Mitigation

There would be no unavoidable adverse effects to geology from implementation of the Proposed Action, and the goal of the Proposed Action is to mine precious metal mineral resources for beneficial use.

Based upon regulatory requirements and mitigation measures that would be incorporated into the Project design, effects of the Proposed Action would be mitigated so that geology or mineral resources impacts would be below levels of significance.

4.1.2. Soil Resources

4.1.2.1. Assumptions and Assessment Guidelines

The Proposed Action would normally have a significant effect on the environment if it would:

- Cause substantial erosion.

4.1.2.2. Impacts of the Proposed Action

Approximately ~~1,400~~ 1,392 acres of surface disturbance is currently anticipated as part of Chemgold's proposed operations within the Project area. However, the Project mine and process area soils are poorly-developed gravelly sands, and only a thin covering of ~~little useful~~ soil is present for Project reclamation and revegetation. Nevertheless, approximately 112,200 cubic yards of soil would be salvaged from all washes and areas where sufficient soil development is noted. Soils would be salvaged to the greatest depth practicable (generally less than 12 inches) and stockpiled for later use during reclamation activities. Soils would be stockpiled at ~~as many as~~ four (4) proposed sites within the Project mine and process area (see Figure 2-2). The soil~~s~~ stockpiles would be clearly identified with signs to assure that the material was not misidentified as waste rock material.

Many of the soils in the Project area, and many of the Project facilities themselves (such as the soil~~s~~ stockpiles, waste rock stockpiles, and heap, etc.), may be subject to erosion, either from precipitation falling directly within the Project area or from flow events in the ephemeral washes. To minimize erosion, Chemgold has indicated that all mine facilities (including the heap leach facility, waste rock stockpiles, soil stockpiles, and roads) would be designed and constructed with erosion control features engineered to meet the performance standards at 14 CCR 3706 (see Section 2.1.11). The Project would also be required to be constructed and operated in accordance with a Storm Water Pollution Prevention Plan, which requires the use of Best Management Practices for erosion control, in accordance with the California Storm Water National Pollution Discharge Elimination System (Storm Water NPDES) permit program (California Water Code Section 13000 *et seq.*).

Surface runoff and drainage from disturbed areas within the Project mine and process area would be controlled, collected, conveyed to sediment basins, and infiltrated (or consumed in mining or the heap leach process). Any areas which might be susceptible to erosion from surface flows would be protected through the use of berms, sediment ponds, rip- rap, check- dams composed of straw bales, sand bags, silt fences, or other techniques to prevent erosion and potential damage. Erosion control methods would be designed to handle a 20-year/1-hour intensity storm event, in accordance with standards established by 14 CCR 3706(d) (SMARA regulations). Modifications to the erosion control methods would be made as necessary over the life of the Project.

Several ephemeral drainages would be temporarily, and eventually permanently, diverted around the Project facilities. Rip- rap would be placed along the channel banks only in the temporary channels to the extent necessary to prevent erosion. Each diversion would channel the flow into another existing wash which was tributary to the same major wash, thus putting all flow back into the same drainage system. Diversion channels would also be built to approximate the original drainage system in both gradient and channel geometry. This would minimize changes in the hydraulic characteristics of the channel and minimize the potential to increase any erosion from the wash. ~~Energy dissipators would be constructed at the end of the diversion channels to minimize the potential of erosion from the diverted flows.~~

Because the washes which flow through the Project mine and process area continue downgradient to the southwest until each eventually ends in individual areas of infiltration on the eastern edge of the Algodones Sand Dunes (see Figure 3-14), there would be no impacts from erosion, sedimentation, or diversion of ephemeral stream channels on any areas outside of the drainage basin, including the Fort Yuma Indian Reservation or Picacho Wash.

4.1.2.3. Mitigation Measures

Incorporated by Project Design:

- 4.1.2-1: Surface disturbance shall be kept to the minimum that is required to construct and operate the project.

- 4.1.2-2: Soils shall be salvaged from all areas where sufficient soil development is noted in conformance with the approved Reclamation Plan. Soils shall be salvaged to the greatest depth practicable and placed in stockpiles clearly delineated with signs to assure the material is not mistaken as waste rock.

- 4.1.2-3: All mine facilities shall be designed and constructed with erosion control features engineered to meet the performance standards ~~at~~ of 14 CCR 3706, including the control of runoff and protection of areas susceptible to erosion from surface flows.

Incorporated by Regulation:

- 4.1.2-4: A Storm Water Pollution Prevention Plan (SWPPP), incorporating the use of Best Management Practices for erosion control, shall be developed and implemented in accordance with the California Storm Water NPDES permit program.

Incorporated to Avoid Potentially Significant Impacts:

No other mitigation measures are proposed or recommended.

4.1.2.4. Unavoidable Adverse Effects and Level of Significance After Mitigation

Implementation of the Proposed Action would result in the unavoidable loss of those soils which cannot be salvaged during construction.

Based upon regulatory requirements and mitigation measures that would be incorporated into the Project design, effects of the Proposed Action would be mitigated so that impacts to soil resources would be below levels of significance.

4.1.3. Hydrologic Resources

4.1.3.1. Surface Waters

4.1.3.1.1. Assumptions and Assessment Guidelines

The Proposed Action would normally have a significant effect on the environment if it would:

- Substantially degrade water quality;
- Contaminate a public water supply;
- Cause substantial flooding or siltation; or
- Substantially alter surface flow conditions, patterns, or rates.

4.1.3.1.2. Impacts of the Proposed Action

Stream Flow Alterations:

The construction of the Proposed Action would include the diversion of segments of three (3) existing ephemeral watercourses, and the permanent filling or excavation of other segments of these watercourses. All diversions divert water entering the Project mine and process area to washes which then flow through the Project mine and process area (see Figure 2-7).

Although these diversions result in a substantial alteration to surface water drainage patterns within the Project mine and process area, because each diversion would channel the flow into another existing wash which was tributary to the same major watercourse, all of the diverted flow would be directed back into the same drainage system. ~~Energy dissipators would also be constructed at the end of the diversion channels, if necessary, to minimize the potential of erosion from the diverted flows.~~ All other storm water surface flows which would not impact Project facilities would be allowed to flow through the Project mine and process area. Thus, all flows would continue in the same channels outside of the Project mine and process area, and there should be no substantial alteration of stream flows or patterns outside of the Project mine and process area.

Precipitation falling within the open pit boundaries would collect on, or infiltrate through, pit floors, thus reducing potential storm water runoff from the Proposed Action compared to the existing desert floor. Precipitation falling on the heap leach pad or within the pregnant or barren ponds would also remain within this closed hydrologic system. Surface runoff and drainage resulting from precipitation falling on the waste rock stockpiles, soil stockpiles, or on project roads and other disturbed areas within the Project mine and process area would be controlled, collected, conveyed to sediment basins, and infiltrated (or consumed in mining or the heap leach process). - Depending on the porosity and permeability of the mine facility and the intensity of the precipitation, storm water runoff may be delayed (such as from rain falling on the porous waste rock stockpiles) or accelerated (such as from the relatively impervious roads). Because the Project mine and process area facilities which may "capture" precipitation are such a minor percentage of the overall surface area of the drainage basins in which they are located, only a very minor reduction in storm water flow downstream from the Project mine and process area would result from the "capture" of precipitation falling within the mine pits and the heap leach system.

Stream Sedimentation and Quality Degradation:

The principal washes within the Project mine and process area appear to be "in balance," meaning that they appear to be neither depositing nor eroding sediment within the Project mine and process area (see Section 3.3.1.3). However, there is a potential for the erosion of materials from the Project soil stockpiles, waste rock stockpiles, and other Project facilities into the washes due to overland storm flow or from erosion by flows in the washes themselves during major precipitation events. Substantial erosion of Project facilities could result in substantial discharge of sediment into the watercourses, which could lead to the deposition of substantial sediment in these watercourses downstream of the Project mine and process area, and which could damage or bury the vegetation in the washes. Areas most susceptible to erosion, and thus the production of sediment, would be steep, loose, waste rock or soil stockpile slopes adjacent to the major throughgoing watercourses; the outside banks of major turns in the washes, and the two (2) new crossings of the western-most wash adjacent to the Project mine and process area by the relocated Indian Pass Road.

Chemgold has incorporated specific measures to reduce the potential for erosion (see Section 4.1.2.3), which would also substantially reduce the potential for sedimentation. These include placing rip rap on the outside bends of diverted stream channels, providing setbacks of facilities (such as the waste rock stockpiles) from the banks of throughgoing washes, and placing berms around facilities as appropriate. In addition, Chemgold has committed to comply with the conditions of the Storm Water NPDES General Permit applicable to the project, and would prepare and follow the requirements of the Storm Water Pollution Prevention Plan (SWPPP) to control drainage and erosion. As a result, the Proposed Action is not anticipated to produce substantial sediment into the washes.

Substantial quantities of various chemicals would be stored and used within the Project area (see Section 2.1.9.4), and substantial quantities of regulated waste (such as waste oil) would be generated (see Section 2.1.9.5). These materials could be released into the watercourses which flow through the Project area, either through spills directly into the washes or from overland flow of either the spilled material or contaminated soil. Minor spills of chemicals and regulated wastes are to be expected during the life of the Project, but should not result in any substantial degradation of surface water quality if promptly contained and collected and properly disposed of off of the site. Chemgold has incorporated specific measures into the Project to reduce the potential for spills of chemicals or regulated waste, and has incorporated

measures to reduce erosion and sedimentation which may transport spilled materials or wastes to the watercourses, which together should substantially reduce the potential for any surface water degradation to insignificance.

The heap leach pad system (heap, pad, ponds, etc.) would be designed to provide for 100-percent containment of the precipitation from the maximum probable one (1)-hour storm event occurring simultaneously with a 24-hour power outage while still maintaining a two-foot freeboard in the process and overflow ponds (see Section 2.1.8). This would greatly limit the potential for failure of the process facilities during high precipitation events which might otherwise result in a discharge of process solution and sediment to the natural drainage channels. In addition, the Waste Characterization Study (EMA, ~~1996~~ 1995) conducted on samples of waste rock and leached ore concludes that these materials are all properly classified as non-acid generating wastes, and that the leachates which may be formed from precipitation moving through the waste rock or leached ore would have very low concentrations of metals.

~~Pit~~ Water: GW Inflow

The East Pit and West Pit would each intercept the local ground water table at elevations of between 211 feet and 88 feet AMSL~~?~~, respectively. Thus, the projected final pit floor elevation of both the East Pit and the West Pit would intersect ground water within the bedrock aquifer. Because of the low permeability and porosity of the bedrock below the ground water table, little ground water is expected to enter the pits. Hydrologic investigations conducted by or on behalf of Chemgold within the proposed pit areas indicate that hydraulic conductivity in the bedrock is very low (WESTEC, Inc., 1996), although the quantity and quality of the acquired data leaves the results somewhat questionable. ? However, ~~In addition,~~ information collected by Chemgold to date indicates that the flow of substantial amounts of ground water from the alluvium bedrock contact into the open pits is highly unlikely. ~~, including~~ This is supported by the fact that approximately 60 percent of the exploration holes drilled in and around the proposed pits have been drilled using dry methods, and only a trace of water has been detected at the alluvium/bedrock contacts (see also Figure 3-9 and Figure 3-10). ~~, indicates that the flow of substantial amounts of ground water from the alluvium bedrock contact into the open pits is highly unlikely.~~ Should ground water be encountered in the pits during mining operations, it would be utilized in dust control operations, or collected and used in process operations.

runoff or direct precipitation

After the cessation of mining activities, it is possible that ground water infilt inflow seepage (and/or rain water) may accumulate in the bottom of the East Pit~~, which is not proposed to be backfilled under the Proposed Action~~. Calculations ~~combining~~ based on projected ground water inflow to the pit ~~inflow~~, annual precipitation, and annual evaporation for the East Pit indicate that the estimated annual evaporation rate is approximately 170 times the annual estimated ground water and precipitation inflow rate (WESTEC, Inc., 1996). Because the project pit inflow data may be questionable, additional ~~Additional~~ calculations using higher ~~even more conservative~~ hydraulic conductivity values were conducted which indicated that annual evaporation would still exceed annual inflow (~~personal communication,~~ Personal Communication - J. Heggeness, WESTEC, Inc., 1996). Thus, the formation of a pit lake in the bottom of the East Pit after the cessation of mining activities is not likely to occur ~~probable~~.

Estimates Because the project pit inflow predictions are based on limited drill hole data

For the event project pit inflow data are

to

needs rewording!

Chemgold has, as part of the Proposed Action, proposed to backfill the West Pit with waste rock and committed to conduct an assessment at the end of mining and to backfill the East Pit with waste rock to an elevation which would ensure that no standing water would remain in the pit bottom if the assessment indicates that there is a reasonable potential for a pit lake to form, which further reduces the potential for the formation of a pit lake. However, the formation of localized seasonal seeps or moist areas in the East Pit remains a possibility.

~~The quality of any pit water may be estimated though the results of the Waste Characterization Study (EMA, 1996 1995; see Appendix B C-1) conducted on samples of waste rock and leached ore. This study concludes that the waste rock and leached ore are properly classified as non acid generating wastes, and that the leachates which may be formed from slightly acidic precipitation (or other slightly acidic waters) moving through these materials would have very low concentrations of metals. Specifically, the metal concentrations analyzed from the SPLP leachate tests on these materials were, with one exception, each below the corresponding State of California maximum contaminant levels (MCLs) for drinking water (the analyzed level of barium was as high as 1.4 mg/l, slightly above the MCL for barium of 1.0 ppm). The quality of this leachate was also suitable for non potable use such as mining and milling.~~

4.1.3.1.3. Mitigation Measures

Incorporated by Project Design:

See also those measures described in Section 4.1.2.3 designed to mitigate erosion and Section 4.1.5.4 designed to mitigate wildlife impacts.

- 4.1.3.1-1: Major watercourses shall be diverted only to the extent necessary to protect Project facilities, and shall be diverted back into the same wash system after as short a diversion as practical. Permanent diversion channels shall be built to approximate the original drainage system in both gradient and channel geometry, and ~~Appropriate energy dissipators shall be constructed at the point of discharge into the pre-existing watercourses, and along banks subject to high erosion potential (such as the outside banks of turns) to minimize the potential for erosion. Diversion channels~~ shall be engineered to adequately contain and deliver stream flows resulting from the 100-year/24-hour precipitation event.

- 4.1.3.1-2: All chemicals shall be stored in conformance with applicable local, state and federal regulations. All non-mining wastes shall be stored in secondary containment area and disposed of offsite in an approved landfill. Regulated wastes shall be recycled or disposed of in conformance with all applicable local, state and federal laws and regulations, and in a manner approved by the responsible regulatory agencies.

- 4.1.3.1-3: Major maintenance of equipment shall be conducted within the concrete-paved and bermed areas of the maintenance yard to the extent possible to minimize accidental discharges of waste lubricants and other materials to the ground.

- 4.1.3.1-4: Each phase of the heap leach pad system (heap, pad, ponds, etc.) shall be designed to provide for 100-percent containment of the precipitation from the maximum probable one (1)-hour storm event occurring simultaneously with a 24-hour power outage while still maintaining a two-foot freeboard in the process and overflow ponds, or consistent with the requirements of the CRWQCB.

Incorporated by Regulation:

See those measures described in Section 4.1.2.3 designed to mitigate erosion.

Incorporated to Avoid Potentially Significant Effects:

- 4.1.3.1-5: Sufficient protective measures, such as set-backs or rip rap, shall be designed and employed to ensure that the pregnant, barren, and overflow ponds will not be exposed to erosion or overtopping by storm flows in the natural watercourse located immediately to the east.

No other mitigation measures are proposed or recommended.

4.1.3.1.4. Unavoidable Adverse Effects and Level of Significance After Mitigation

Unavoidable adverse effects to surface water flow within the Project mine and process area would result from implementation of the Proposed Action.

Implementation of the measures incorporated into the Project design, construction, and operation; incorporated by regulation; and recommended, should keep effects to surface water resources from implementation of the Proposed Action below the level of significance.

4.1.3.2. Ground Waters

4.1.3.2.1. Assumptions and Assessment Guidelines

The Proposed Action would normally have a significant effect on the environment if it would:

- Substantially degrade water quality;
- Contaminate a public water supply;
- Substantially degrade or deplete ground water resources; or

- Interfere substantially with ground water recharge.

4.1.3.2.2. Impacts of the Proposed Action — this is a repeat - see pg. 4-9. move up

Ground Water Production:

Ground water would be produced to supply water for heap leach processing and other service water requirements. ~~Up~~ A total of up to 1,000 gpm, or 1,200 afy, of ground water would be supplied from up to four (4) wells drilled in the Project ancillary area southwest of the Project mine and process area ~~or in the Project mine and process area itself~~.

The projected drawdown of ground water levels in the vicinity of the Project ground water well(s) as a function of time were calculated using data collected during the test of ground water exploration well PW-1 (WESTEC, Inc., 1996; see Table 4-2). These calculations assumed an individual ground water supply well, located in the vicinity of ground water exploration well PW-1, would produce approximately 725 gpm, or 1,170 afy, for 20 years. An average hydraulic conductivity of 16 ft/day was assumed for all calculations. Several different drawdown scenarios were calculated using a range of aquifer parameters. The calculations were performed using an aquifer thickness of 300 feet to 600 feet, and a storage coefficient ranging from 0.02 to 0.002. The calculations show that drawdowns ~~of~~ ranging from ~~1.6~~ 1.5 feet to 6.4 feet are projected to occur at distances of approximately 50,000 feet (approximately nine and one-half (9.5) miles) from the pumping well after 20 years of continuous pumping (WESTEC, Inc., 1996). Maximum predicted drawdown at a distance of 1,000 feet from the modelled water supply well is 19.2 to 24.4 feet. These results would ~~be~~ likely be conservative because they assume no recharge of the ground water basin (previously estimated at 100,000 afy); assume all wells would be located in the same aquifer as the production well; and assume ~~a~~ conservative thicknesses for the aquifer (thicknesses of 1,000 feet have actually been measured).

Table 4-2: Summary of Calculated Well Drawdown After 20 Years

Pumping Rate (gpm)	Aquifer Thickness (ft)	Transmissivity (ft^2/day)	Storage Coefficient	Distance to Drawdown Contour in feet			
				1,000	10,000	20,000	50,000
725	300	4,800	0.02	19.2	8.6	5.4	1.8
725	400	6,400	0.02	14.9	6.9	4.5	1.7
725	500	8,000	0.02	12.2	5.8	4.0	1.6
725	600	9,600	0.02	10.4	5.1	3.4	1.5
725	300	4,800	0.002	24.4	13.8	10.6	6.4
725	400	6,400	0.002	18.8	10.8	8.5	5.3
725	500	8,000	0.002	15.4	9.0	7.1	4.6
725	600	9,600	0.002	13.0	7.7	6.1	4.0

Conservative ground water level drawdowns were also calculated for three (3) specific wells located in the vicinity of the Project: the Gold Rock Ranch well, located approximately four and one-half (4.5) miles from well PW-1; the Mesquite Mine well GF-3A, located approximately eight (8) miles from well PW-1; and the American Girl Mine well 26-2, located approximately eight (8) miles from well PW-1 (WESTEC, Inc., 1996; see Table 4-3). For an aquifer with a thickness of 500 feet (a saturated thickness of 500 feet was used for the alluvial aquifer to account for the thickening of the aquifer to the southwest, (Dutcher, et. al., 1972)) and a storativity value of 0.02, a Project well pumping at a rate 725 gpm over a period of 20 years was predicted to result in a drawdown of 3.7 feet in the Gold Rock Ranch Well, and a drawdown of 1.8 feet in both the Mesquite Mine well and the American Girl Mine well (WESTEC, Inc., 1996). These conservative drawdowns represent a three (3) percent, one-half (0.5) percent, and one and one-half (1.5) percent drawdown of the depth of the Gold Rock Ranch, Mesquite Mine, and American Girl Mine ground water wells, respectively, over the life of the Project.

Table 4-3: Calculated Drawdown of Selected Wells After 20 Years

Pumping Rate (gpm)	Aquifer Thickness (ft)	Transmissivity (ft^2/day)	Storage Coefficient	Gold Rock Ranch Well (126 ft. water column) 4 miles from well	Mesquite Mine Well (470 ft. water column) 8 miles from well	American Girl Mine Well 26-2 (110 ft. water column) 9 miles from well
				(ft of drawdown)		
725	500	8,000	0.02	3.7	1.8	1.8

It is unlikely that any effects of the Project's ground water production would translate into effects to any ground water which may exist beneath Picacho Wash because of the relatively great depth to ground water which may be supported by recharge from the All American Canal and the Colorado River. In addition, a number of published hydrogeologic studies have placed ~~and the likely existence of~~ a ground water divide between the Amos-Ogilby-East Mesa and Picacho Wash Basins, such that ground water would flow away from, rather than toward, the divide (Bedlinger, et.al., 1983; Loeltz, et.al., 1975; and Dutcher, et.al., 1972)~~) basins at a height above the ground water table~~. sp

Little ground water is found in the alluvial aquifers within the Project mine and process area. This is because there is little recharge from the infrequent rains in the Chocolate Mountains, and the thin alluvial aquifers do not extend down into the water table of the Amos-Ogilby-East Mesa Basin. This water table, found at an elevation of approximately 75 feet in the Project production well field area, is presumed to be recharged by leakage from the All American Canal and the Colorado River in the area between Pilot Knob and the Cargo Muchacho Mountains.

Bedrock in the Project mine and process area has a relatively low permeability, and acts generally as a barrier to the flow of~~-groundwater~~ ground water. Bedrock is not exposed at the surface of the divide between the Picacho Wash and Indian Wash surface drainage basins (elevation approximately 960 feet), and no data (gravity, etc.) has been made available to specifically judge the depth to bedrock. However, bedrock in the divide is assumed to be shallow, no deeper than several hundred feet, since the divide is bounded by the exposed basement rocks of the Cargo Muchacho Mountains on the southwest and the Chocolate Mountains three (3) miles away to the northeast. Further, the depth to basement rock in the Project mine and

process area, located approximately four (4) miles northwest of the divide at an elevation of approximately 860 feet, and at a similar distance from the Chocolate Mountains, is zero (0) to 300 feet (860 to 560 feet AMSL), and exploration drilling to the southeast of the Project mine and process area has also encountered bedrock at relatively shallow depths (Personal Communication, Dan Purvance, Chemgold, Inc., 1996) (see Figure 3-10). Thus, it is very likely that a subsurface bedrock barrier to ground water flow exists between the Indian Wash basin and the Picacho Wash basin at an elevation at least several hundred feet above the elevation of the main basin water table.

Static water levels in the Project mine and process area are as high as 300 feet AMSL, well above the level of the Colorado River/All American Canal in the vicinity of downstream end of Picacho Wash (approximately 120 feet AMSL). The measured static water level in the Project production well field area, at well PW-1, is 72.4 feet, well below the level of the Colorado River/All American Canal.

Comparing the amount of water projected to be extracted during the life of the Project to the estimated usable and recoverable stored water and estimated recharge, the Project should not significantly impact the alluvial ground water resources of the area. The Project's extraction rate of ~~1,170~~ 1,200 afy represents about one (1) percent of the annual recharge of the entire Amos-Ogilby-East Mesa Basin. Over the 20-year projected life of the Project, the Project would use an estimated ~~23,400~~ 24,000 af of water, which represents approximately 0.01 percent of the estimated 230,000,000 af of useable and recoverable water in the Amos-Ogilby-East Mesa Basin (WESTEC, Inc., 1996).

Ground Water Quality:

Given the depth to ground water in the Project area, there is little potential for degradation of ground water quality from accidental spills or leakage of chemicals or regulated wastes from containment areas or from the leach pad facility. Minor spills of chemicals and regulated wastes are to be expected during the life of the Project, but should not result in any substantial degradation of ground water quality if promptly contained and collected and properly disposed of. Chemgold has also incorporated specific measures into the Project to reduce the potential for spills of chemicals or regulated waste.

The heap leach pad has been designed with a dual liner to decrease the potential for any leakage of leach solution. Rigorous inspections would be

required by the CRWQCB Waste Discharge Requirements during the installation of the liner to prevent holes, tears, or incompletely welded seams. The pad is also designed to drain by gravity into the solution collection system and solution ponds so that there is only a minimum layer of saturated drain rock (typically less than one (1) foot) above the liner, thus reducing the hydraulic head across the liner.

Monitoring of both the vadose zone and ground water for evidence of leakage of leach solution would be conducted under the Proposed Action, and would also be required by the Waste Discharge Requirements issued by the CRWQCB. The CRWQCB will typically require monthly sampling of monitoring points and analysis for the constituents of concern (those constituents of the process solution, such as cyanide and select metals, which if detected in the vadose zone or ground water monitoring points would likely indicate a leak). Results would be required to be reported monthly, more rapidly if evidence of a leak is detected. Detected leaks would be evaluated and corrected under the supervision of the CRWQCB, either through excavation of the heaped material and repair of the liner, if the height of the heap at the time of detection of the leak is not too great, or through reducing or eliminating the application of leach solution to the heap over the leak. Leaks are not common place and are usually detected while still small. Remediation of leaked solution is typically not required because the weak cyanide solution degrades rapidly as the pH drops and it is oxidized in the air, and the soil and rock material above the ground water can attenuate the concentrations of the metals. Taken together, these measures reduce the potential for any ground water quality degradation to insignificance.

It is also unlikely that any degradation of ground water in the Picacho Wash area would result from any accidental spills or leakage of chemicals or regulated wastes from Project containment areas or from the leach pad facility. In addition to the presumed bedrock ground water barrier located between the Indian Wash basin and the Picacho Basin, the ground water gradient established by the data presented by WESTEC in its report clearly trends down to the southwest, away from the Project mine and process area toward the area of the Project production well field (near well PW-1), and away from the surface boundary between the Indian Wash and Picacho Wash basins. ~~Static water~~

Pit Water Quality:

As discussed in Section 4.1.3.1.2, the formation of a pit lake in the bottom of the East Pit following the completion of pit mining is not~~-probable~~ likely to occur, and Chemgold has further committed to backfilling the pit to an elevation that is above the predicted level of any pit lake should a study ~~reasonably~~ determine that a pit lake ~~may~~ is likely form (see Section 2.1.3)~~ and it is very likely that any water which does collect from ground water in the bottom of the pit would relatively good quality water~~. Based upon the high acid neutralization potential reported for the samples of waste rock and leached ore in the Waste Characterization Study (see Appendix~~-B~~ C-1), ground water moving through backfilled waste rock (or leached ore) in either the West Pit or East Pit would not be likely to generate acidic waters. In addition, the results of the SPLP extractions conducted on the same rock materials indicate that the ground waters would not be likely to ~~extract~~ leach substantial quantities of metals from these rock materials, and the ground water quality would likely remain relatively unchanged.

done at closure

To ~~further~~ assess the potential interactions which may occur between the waste rock, which may be backfilled into either the West Pit or East Pit, and the ground water which may enter either pit under the backfill scenario, an additional geochemical investigation was conducted (see Appendix C-2) to supplement the earlier the original Waste Characterization Study. Samples of each of the rock types which may be backfilled into either the West Pit or East Pit were processed by ~~several~~ standard USEPA~~-extraction~~ chemical techniques to conservatively simulate what constituents may be leached from the rock if exposed to ground waters entering a backfilled pit. Modelling was then conducted using analyses of the extracted constituents, analyses of the ground water, and the mineral phases of the rock to evaluate impacts to the ground water after equilibration.

Representative composite samples of each of the three principal rock types to be mined (sericite gneiss, biotite gneiss, and gravels) (see Section 3.1.1) were first ~~extracted~~ tested using USEPA Method 1312, which is designed to determine the mobility of both organic and inorganic constituents in liquids, soils and wastes. It uses a 60/40 weight percent of sulfuric acid/nitric acid diluted with deionized water to a pH of 5.0 added to the solid sample, which is then agitated for 18 hours. The resultant liquid (leachate) is then filtered and analyzed. The analytical results from each of the three (3) samples show that the extracted constituents are in low concentrations, in most cases at or below the respective concentrations in the ground water currently in the undeveloped pits, and are below current California water quality standards except the primary selenium MCL and the secondary manganese MCL (see Appendix C-2).

Additional representative composite samples of four (4) rock types (sericite gneiss, biotite gneiss, volcanics, and gravels) (see Section 3.1.1) were also collected from both the East Pit and West Pit and extracted using USEPA Method 1320, the Multiple Extraction Procedure, which is "designed to simulate the leaching that a waste will undergo from repetitive precipitation of acid rain on an improperly designed sanitary landfill. The repetitive extractions reveal the highest concentration of each constituent that is likely to leach in a natural environment." (USEPA, 1986). As such, this test is very conservative for the types of materials and the geologic environment ~~found within the~~ a backfilled Project pits.

The first Method 1320 extraction uses USEPA Method 1310 (Extraction Procedure (EP) Toxicity Test Method) to extract constituents from the solid by agitating for 24 hours with deionized water which is maintained at a pH of 5.0 with acetic acid. The resulting leachate is then filtered and analyzed. Nine (9) subsequent extractions are then sequentially undertaken on the solid residual in 24 hr. periods using a 60/40 weight percent of sulfuric acid/nitric acid diluted with deionized water to a pH of 3.0, each agitated for 24 hours. The resultant leachate from each extraction is filtered and analyzed.

9? 4 samples used in the EPA 1320 analysis

The analytical results from the six (6) samples show, ~~as expected~~, that the concentration of the constituents ~~extracted during~~ in the first extraction are much higher than in ~~the~~ subsequent extractions (see Appendix C-2). TDS and alkalinity concentrations were uniformly higher than in the ground water in the first extraction for all rock types, as were the concentrations of aluminum, calcium, and manganese. The pH was also uniformly lower than the ground water, reflecting the acidic extraction fluid. Concentrations of copper, lead, potassium, strontium, titanium, zinc, barium, chromium, thallium, beryllium, magnesium, cadmium, arsenic, or silver in the first extractions of some samples also slightly exceeded the respective constituent concentrations in the ground water. Constituent concentrations in extractions 2 through 10 were typically lower than ~~both the~~ concentrations in the existing ground water or extraction 1, although iron concentrations increased in nearly all samples in the later extractions, reflecting the low pH in the extraction fluid and the lack of alkalinity remaining in the sample.

further state why this is not a problem.

The analytical results of the Method 1320 extractions show that high concentrations of calcium and available alkalinity may leach from the backfilled material, probably due to the rigorous leaching procedure and the dissolution of calcite ($CaCO_3$) which is present as a secondary mineral phase in the rocks. The relatively high manganese concentrations in the Method 1320 extraction leachates are also due to the rigorous leaching method

and the dissolution of secondary manganese minerals (oxyhydroxides) in the rock.

Geochemical models were also run to test the effects of the ground water flowing into the pits and equilibrating with the backfilled material under earth surface conditions. The results of these geochemical models were then evaluated relative to existing (background) ground water quality and to the potential impacts to ground water quality downgradient from the pits. Because calcite ($CaCO_3$) is the most reactive mineral phase present in the rocks, the models assumed that inflowing ground water would equilibrate with calcite and with atmospheric carbon dioxide (CO_2). The model inputs were derived from the analytical results of the ground water samples collected in the areas of the pits, the Method 1312 extractions, and the Method 1320 extractions. The results of all of the geochemical models ~~show~~ predicts that the dissolved constituent concentrations present in the ground water which has equilibrated with the backfilled material in the pits will be at, or below, the current concentrations present in the ground water. Therefore, no impacts to ground water quality are expected to occur from the complete or partial backfilling of any of the Project pits.

4.1.3.2.3. Mitigation Measures

Incorporated by Project Design:

See also those measures described in Section 4.1.3.1.3 designed to mitigate water quality degradation from chemical spills and use, Section 4.1.12.3 designed to respond to and remediate any chemical spills, and Section 4.1.5.4 designed to eliminate the possibility of a pit lake in the East Pit to mitigate potential impacts to wildlife.

- 4.1.3.2-1: To prevent excessive drawdown or possible damage to the well or pumping system, ground ~~Ground~~ water production from well PW-1 shall be limited to a maximum average of 550 gpm unless a higher pumping rate, supported by reasonable proof of increased well efficiency, is approved by the ICPBD. The maximum average production rate from each additional production well drilled shall be limited to that rate which prevents excessive drawdown or possible damage to the well or pumping system.

  spell out

- 4.1.3.2-2: Ground water production and monitoring wells shall be plugged and abandoned in conformance with applicable regulatory requirements, including 14 CCR 3713(a).

- 4.1.3.2-3: The total maximum production rate from all of the ground water production wells shall not exceed 1,000 gpm, and the total annual ground water production rate shall not exceed 1,200 afy.

Incorporated by Regulation:

- 4.1.3.2-~~3~~4: The heap leach pad shall be designed, constructed and operated in conformance with the specifications, requirements and prohibitions of Waste Discharge Requirements issued by the CRWQCB.

- 4.1.3.2-~~4~~5: The heap leach pad shall be monitored in conformance with the requirements of the Monitoring and Reporting Program issued by the CRWQCB.

Incorporated to Avoid Potentially Significant Effects:

No other mitigation measures are proposed or recommended.

4.1.3.2.4. Unavoidable Adverse Impacts and Level of Significance After Mitigation

Implementation of the Proposed Action will result in the unavoidable loss of ground water produced from the ground water production field, and may result in the unavoidable loss of minor quantities of ground water if exposed as seeps in the walls of the East Pit after the cessation of mining.

Based upon regulatory requirements and mitigation measures that would be incorporated into the project design, effects of the Proposed Action would be mitigated so that impacts to ground water resources would be below levels of significance.

4.1.4. Air Resources

4.1.4.1. Assumptions and Assessment Guidelines

The Proposed Action would normally have a significant effect on the environment if it would:

- Violate any regulatory requirement of the ICAPCD; or
- Violate any ambient air quality standard; or

- Contribute substantially to an existing or projected air quality violation; or

- Expose sensitive receptors to substantial pollutant concentrations.

4.1.4.2. Impacts of the Proposed Action

Air Pollutant Emission Sources and Emissions:

The proposed Project consists of many activities and operations, each of which may have the potential to emit air pollutants. A list of each of the identified individual potential sources of Project air pollutant emissions ("emission units"), organized into "emission groups" of similar activities (such as mining, heap leaching, etc.), are presented in Table 4-4.

In addition to being organized into emission groups, these emission units can also be characterized by the "type" of emission unit. Four (4) different types of emission units are applicable to the Project: stationary "point" sources (e.g., the diesel-fuel emergency electric generator); "fugitive" sources (i.e., those which do not emit pollutants from single points, but from diffuse areas (e.g., dust generated by vehicles moving on unpaved roads or windblown dust)); mobile combustion sources (e.g., the "tailpipe" emissions from haul trucks, dozers, etc.); and "other" sources (e.g., vapor emissions from the storage of fuel in storage tanks). Table 4-4 also lists the emission "type~~.~~" of each of the Project emission sources.

Table 4-4: List of Potential Emission Sources and Type for the Proposed Action

Emission Unit	Emission Unit Description	Emission "Source" Type			
		Point	Fugitive	Mobile	Other
Emission Unit Group 1: Mining Activity					
1.001	Drilling - Waste Rock		X		
1.002	Drilling - Ore		X		
1.003	Blasting - Waste Rock		X		
1.004	Blasting - Ore		X		
1.005	Waste Rock Loading		X		
1.006	Ore Loading		X		
1.007	Waste Rock Dumping		X		
1.008	Ore Dumping		X		
1.009	Waste Rock Dozing		X		
1.010	Waste Rock Hauling		X		
1.011	Ore Hauling		X		
1.012	Ammonium Nitrate Prill Silo Loading	X			
1.013	Ammonium Nitrate Prill Silo Unloading	X			
1.014	Wind Erosion (Waste Rock Stockpile)		X		
1.015	Wind Erosion (Soil Stockpiles)		X		
1.016	Haul Truck (Combustion)			X	
1.017	Mine Dozer (Combustion)			X	
1.018	Drill Rig (Combustion)			X	
1.019	Loader (Combustion)			X	
1.020	Clean-Up Loader (Combustion)			X	
Emission Unit Group 2: Heap Leaching Activity					
2.001	Portable R-O-M Lime Silo Loading	X			
2.002	Portable R-O-M Lime Hopper Loading	X			
2.003	Lime Application to Ore		X		
2.004	Ore Ripping/Spreading/Dozing		X		
2.005	Grader (Combustion)			X	
2.006	Heap Leach Dozer (Combustion)			X	
2.007	Cyanide Application and Leaching		X		
2.008	Pregnant Solution Pond		X		
2.009	Barren Solution Pond		X		
2.010	Wind Erosion (Heap Leach Pad) - Non-Leach		X		
2.011	Wind Erosion (Heap Leach Pad) - Leach		X		

Emission Unit	Emission Unit Description	Emission "Source" Type			
		Point	Fugitive	Mobile	Other
Emission Unit Group 3: Process Plant					
3.001	Carbon Adsorption Tank 1		X		
3.002	Carbon Adsorption Tank 2		X		
3.003	Carbon Adsorption Tank 3		X		
3.004	Carbon Adsorption Tank 4		X		
3.005	Carbon Adsorption Tank 5		X		
3.006	Acid Wash Tank		X		X
3.007	Cyanide Make-up Tank		X		
3.008	Strip Tank		X		
3.009	Electrowinning Cell		X		X
Emission Unit Group 4: Refining					
4.001	Mercury Retort Furnace (Electric)	X			
Emission Unit Group 5: Laboratory					
5.001	Jaw Crusher	X			
5.002	Pulverizer	X			
5.003	Fume Hood	X			
5.004	Waste Acid Tank		X		
Emission Unit Group 6: Shop Area					
6.001	Main Diesel Tank 1				X
6.002	Street Diesel Tank				X
6.003	Unleaded Gasoline Tank				X
6.004	Coolant Tank				X
Emission Unit Group 7: Mine & Process Area Support Activities					
7.001	Water Truck (Combustion)			X	
7.002	Water Truck Traffic		X		
7.003	Backup Diesel-Fueled Generator	X			
Emission Unit Group 8: Other Mobile Emission Units					
8.001	On-Site Delivery Truck Traffic		X		
8.002	On-Site Light Vehicle Traffic		X		
8.003	Off-Site Delivery Truck Traffic		X		
8.004	Off-Site Light Vehicle Traffic		X		
8.005	On-Site Delivery Truck (Combustion)			X	
8.006	On-Site Light Vehicle (Combustion)			X	

Estimates of the annual emissions of each applicable criteria air pollutant from each emission unit were prepared using generally available emission estimating techniques and operational parameters for each of the emission units as provided by Chemgold, assuming the implementation of the "emission control" techniques proposed to be implemented as a part of the Proposed Action to reduce emissions (such as the watering of roads) [see Appendix L of this EIS/EIR]. Table 4-5 provides a summary of the maximum estimated daily (in pounds per day) and annual (in tons per year) regulated (criteria) air pollutant emissions expected from the Project.

Table 4-5: Summary of Total Calculated Emissions of Regulated Air Pollutants

Emission Unit No.	Emission Unit Description	Regulated Air Pollutants											
		TSP		PM10		SOx		NOx		CO		VOCs/ROGs	
		(lbs/day)	(tons/yr)	(lbs/day)	(tons/yr)	(lbs/day)	(tons/yr)	(lbs/day)	(tons/yr)	(lbs/day)	(tons/yr)	(lbs/day)	(tons/yr)
Emission Unit Group 1: Mining Activity													
1.001	Drilling - Waste Rock	5.27	0.97	2.63	0.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.002	Drilling - Ore	1.76	0.32	0.88	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.003	Blasting - Waste Rock	50.00	1.97	25.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.004	Blasting - Ore	0.00	0.66	0.00	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.005	Waste Rock Loading	50.80	8.56	24.03	4.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.006	Ore Loading	16.93	2.85	8.01	1.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.007	Waste Rock Dumping	125.09	21.07	59.17	9.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.008	Ore Dumping	41.70	7.02	19.72	3.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.009	Waste Rock Dozing	33.72	6.15	4.31	0.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.010	Waste Rock Hauling	96.16	16.20	28.85	4.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.011	Ore Hauling	32.05	5.40	9.62	1.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.012	Ammonium Nitrate Prill Silo Loading	0.50	0.05	0.25	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.013	Ammonium Nitrate Prill Silo Unloading	0.30	0.05	0.15	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.014	Wind Erosion (Waste Rock Stockpile)	17.94	3.05	8.97	1.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.015	Wind Erosion (Soil Stockpiles)	4.49	0.76	2.24	0.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.016	Haul Truck (Combustion)	110.58	20.25	57.50	10.53	194.92	35.69	1,787.35	327.30	771.29	141.24	84.96	15.56
1.017	Mine Dozer (Combustion)	6.34	1.16	3.30	0.60	13.36	2.44	122.55	22.37	52.88	9.65	5.83	1.06
1.018	Drill Rig (Combustion)	38.33	7.09	19.93	3.69	18.64	3.45	283.52	52.48	61.07	11.30	22.50	4.16
1.019	Loader (Combustion)	15.78	2.88	8.21	1.50	16.80	3.07	183.01	33.40	53.13	9.70	23.24	4.24
1.020	Clean-Up Loader (Combustion)	4.18	0.76	2.18	0.40	4.46	0.81	48.53	8.86	14.09	2.57	6.16	1.12
	SUBTOTAL - EMISSION UNIT GROUP 1:	651.92	107.25	284.93	46.59	248.18	45.46	2,424.96	444.40	952.47	174.46	142.70	26.15

Emission Unit No.	Emission Unit Description	Regulated Air Pollutants											
		TSP		PM10		SOx		NOx		CO		VOCs/ROGs	
		(lbs/day)	(tons/yr)	(lbs/day)	(tons/yr)	(lbs/day)	(tons/yr)	(lbs/day)	(tons/yr)	(lbs/day)	(tons/yr)	(lbs/day)	(tons/yr)
Emission Unit Group 2: Heap Leaching Activity													
2.001	Portable R-O-M Lime Silo Loading	0.14	0.01	0.07	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.002	Portable R-O-M Lime Hopper Loading	0.65	0.11	0.65	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.003	Lime Application to Ore	0.08	0.01	0.04	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.004	Ore Ripping/Spreading/Dozing	29.72	5.42	3.68	0.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.005	Grader (Combustion)	4.08	0.74	2.12	0.39	5.73	1.05	46.61	8.51	10.03	1.83	2.34	0.43
2.006	Heap Leach Dozer (Combustion)	6.34	1.16	3.30	0.60	13.36	2.44	122.55	22.37	52.88	9.65	5.83	1.06
2.007	Cyanide Application and Leaching	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.008	Pregnant Solution Pond	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.009	Barren Solution Pond	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.010	Wind Erosion (Heap Leach Pad) - Non-Leach	8.23	1.40	4.12	0.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.011	Wind Erosion (Heap Leach Pad) - Leach	0.41	0.07	0.21	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SUBTOTAL - EMISSION UNIT GROUP 2:	49.64	8.93	14.17	2.52	19.09	3.48	169.16	30.87	62.92	11.48	8.16	1.49
Emission Unit Group 3: Process Plant													
3.001	Carbon Adsorption Tank 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3.002	Carbon Adsorption Tank 2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3.003	Carbon Adsorption Tank 3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3.004	Carbon Adsorption Tank 4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3.005	Carbon Adsorption Tank 5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3.006	Acid Wash Tank	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3.007	Cyanide Make-up Tank	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3.008	Strip Tank	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3.009	Electrowinning Cell	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SUBTOTAL - EMISSION UNIT GROUP 3:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Emission Unit No.	Emission Unit Description	Regulated Air Pollutants											
		TSP		PM10		SOx		NOx		CO		VOCs/ROGs	
		(lbs/day)	(tons/yr)	(lbs/day)	(tons/yr)	(lbs/day)	(tons/yr)	(lbs/day)	(tons/yr)	(lbs/day)	(tons/yr)	(lbs/day)	(tons/yr)
	Emission Unit Group 4: Refining												
4.001	Mercury Retort Furnace (Electric)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SUBTOTAL - EMISSION UNIT GROUP 4:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Emission Unit Group 5: Laboratory												
5.001	Jaw Crusher	1.02	0.19	0.07	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5.002	Pulverizer	1.02	0.19	0.07	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5.003	Fume Hood	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5.004	Waste Acid Tank	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SUBTOTAL - EMISSION UNIT GROUP 5:	2.04	0.37	0.14	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Emission Unit Group 6: Shop Area												
6.001	Main Diesel Tank 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.04
6.002	Street Diesel Tank	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
6.003	Unleaded Gasoline Tank	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.26	0.59
6.004	Coolant Tank	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SUBTOTAL - EMISSION UNIT GROUP 6:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.46	0.63
	Emission Unit Group 7: Mine & Process Area Support Activities												
7.001	Water Truck (Combustion)	6.72	1.13	3.50	0.59	11.85	1.99	108.67	18.21	46.90	7.86	5.17	0.87
7.002	Water Truck Traffic	0.11	0.02	0.03	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7.003	Backup Diesel-Fueled Generator	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.38	0.00	0.10	0.00	0.01
	SUBTOTAL - EMISSION UNIT GROUP 7:	6.83	1.15	3.53	0.60	11.85	1.99	108.67	18.60	46.90	7.96	5.17	0.88
	Emission Unit Group 8: Other Mobile Emission Units												
8.001	On-Site Delivery Truck Traffic	0.78	0.14	0.23	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8.002	On-Site Light Vehicle Traffic	12.31	2.25	3.69	0.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8.003	Off-Site Delivery Truck Traffic	22.14	4.04	6.64	1.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8.004	Off-Site Light Vehicle Traffic	190.63	34.79	57.19	10.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SUBTOTAL - EMISSION UNIT GROUP 8:	225.85	41.22	67.76	12.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	TOTAL - ALL EMISSION UNIT GROUPS:	936.29	158.93	370.53	62.10	279.13	50.94	2,702.79	493.87	1,062.29	193.90	159.49	29.15

~~By far the~~ The largest proportion of the emission units~~, both in number and total emissions,~~ are the fugitive emission sources, especially emitters of fugitive particulate matter (TSP and PM_{10}). Mining and heap leaching activities, such as blasting, loading, dumping and dozing, release fugitive particulate matter into the air through the physical movement of the ore or waste rock. Ore and waste rock hauling, and truck and vehicle traffic, all generate fugitive particulate matter emissions by traveling on unpaved roads. Finally, wind erosion of both the waste rock stockpiles and ore heap can generate fugitive particulate matter emissions. ~~Many of the PM_{10} emission estimates indicated in the Air Quality Analysis and in Table 4-5 are very conservative, since they do not include certain mitigating circumstances (such as emissions below the rim of the pit, which are not likely to move off-site; or the reduced emissions from inactive heap and stockpiles surfaces), and these values should be considered the maximum, rather than the average or expected, emission rate for each unit.~~

Mobile sources, the next largest category of sources, are principally associated with the mining and heap leaching process. They consist exclusively of large diesel engines which power the haul trucks, dozers, graders, and water trucks. Because of the high percentages of use (many will operate nearly 24 hours per day), these mobile sources will produce substantial quantities of "tailpipe" combustion emissions, such as NO_x, SO_x, and CO.

Most of the mobile sources fall into the category of "non-road engines," generally defined under 40 CFR §89 as internal combustion engines which are in or propel a vehicle ~~which~~ which is not a "road" vehicle, or are portable or transportable, but which do not remain in a fixed location for more than a year. These federal regulations require that "non-road" engines must be manufactured to meet specific emission standards for criteria pollutants, based on the size (hp rating) of the engine and date of manufacture, according to a specific timetable commencing on January 1, 1996. Table 4-6 lists the identified Project "non-road" engines, the size (kW rating) of each, whether the engine will be purchased (in 1997) "new" or "used", and whether the engine will be subject to these new federal emission limitations.

Table 4-6: List of Project "Non-Road" Engines and Applicable Criteria

Engine	Engine Rating	Year of Manufacture	Applicability of 40 CFR 89
Haul Trucks (8)	2,500 hp	1997	No
Dozers (2)	375 hp	1997	Yes
Drill Rig (1)	550 hp	1997	Yes
Loader (1)	1,250 hp	1997	No
Clean-up Loader (1)	690 hp	<1996	No
Water Trucks (2)	1,050 hp	<1996	No
Grader (1)	275 hp	1997	Yes
Back-Up Generator (1)	750 hp	1997	Yes

Based on the Project engine size ratings and their assumed date of manufacture (based on the purchase date), less than half of the Project "non-road" engines would be required to be manufactured to met the new federal emission standards. However, many engine manufacturers are already meeting or exceeding the new emission standards.

Although the Project has a number of stationary point sources, these sources are individually and collectively ~~small~~ minor sources of criteria air pollutant emissions. About one-half (½) of the stationary point sources are combustion sources, which as a class emit substantially more gaseous combustion pollutants (NO_x, SO_x, and CO) than particulate matter.

Finally, the "other" category of criteria pollutant emission sources consists exclusively of the diesel, gasoline and other volatile organic compound storage and dispensing tanks. However, the total quantities of these materials emitted by the Project to the atmosphere are small.

<u>Federal PSD Regulations</u>:

Federal Prevention of Significant Deterioration (PSD) regulations are applicable only to major stationary sources which are either specific types of facilities which emit, or have the potential to emit, 100 tons per year or more of a criteria pollutant, or any facility

which emits, or has the potential to emit, 250 tons per year or more of any criteria pollutant. Most fugitive emissions, however, are not included as applicable emissions under the federal PSD program. Since the few stationary emission units under the Proposed Action emit collectively substantially less than 1 ton per year of any criteria pollutant, the Project is not subject to federal PSD regulations.

Title V of the CAAA:

The CAAA included Title V, which established a very detailed and extensive operating permit system for "major sources" of regulated air pollutants. The ICAPCD has adopted Rule 900 to implement Title V within the District, and USEPA's delegation of authority to implement Title V through Rule 900 became effective on June 2, 1995. Rule 900 is applicable only to "major" sources of air pollutants, which are defined as "a stationary source which has the potential to emit a regulated air pollutant or a hazardous air pollutant (HAP) in quantities equal to or exceeding the lesser of any of the following thresholds:"

"100 tons per year (tpy) of any regulated air pollutant;"

"10 tpy of one HAP or 25 tpy of two or more HAP's; or"

"Any lesser quantity threshold promulgated by the U.S. EPA."

At present, no lower quantity threshold has been set by the U~~.~~S~~.~~EPA.

To determine the applicability of Title V (Rule 900) to the Project, an inventory of the annual potential to emit for each of the applicable emission units was conducted for the Proposed Action (see Appendix L). Since Title V (Rule 900) is basically applicable only to stationary point sources of criteria (regulated) air pollutants, few of the Project's emission units are included in the Title V applicability for criteria pollutants. The largest applicable annual emission rate ~~of~~ for a single criteria pollutants for the Proposed Action is ~~4.5~~ 0.64 tons per year of ~~NO_2~~ volatile organic compounds/reactive organic gases (VOCs/ROGs); all of this is emitted from the fuel and other organic liquid storage and dispensing facilities ~~emergency generator~~.

HAPs are specifically listed hazardous air pollutants, some of which can be found in many of the natural earth materials which will be mined by the Project; in the fuels used and stored by the Project;

and in the solution used to leach the precious metals from the ore. Current USEPA and ICAPCD guidance provides that reasonably quantifiable HAP emissions from fugitive sources, as well as from stationary sources, must be counted to determine the applicability of Title V for HAPs. The potential HAPs component of the emitted Project particulates has been conservatively estimated by assuming that all of the HAPs contained in the fugitive particulate matter are subject to Title V (Rule 900). Based upon analyses of ore and waste rock samples collected during exploration drilling (see Section 2.1.4), and using the calculated total annual TSP emission estimates (see Table 4-5), the total annual emission of particulate-based HAPs has been estimated at less than ~~0.75~~ 0.01 tons (see Appendix L).

HAPs released as a result of the combustion of diesel fuel and gasoline in mobile engines are not subject to Title V (Rule 900). Because of its limited use, combustion ~~Combustion~~ HAPs from the diesel-fueled emergency generator total less than ~~1 ton~~ one (1) pound (0.0002 ton) per year.* The HAPs released from the leaching solution (principally HCN), which are difficult and unreliable to estimate and may not be subject to Rule 900, are estimated at 9.5 tons per year, slightly less than the 10-tons-per-year Title V threshold for a single HAP. The total annual emission of all potentially applicable HAPs from the Project, including HCN, is ~~slightly more than 11.2~~ approximately 9.9 tons, substantially below the 25 ton Title V threshold (see Appendix L).

As a result, the Project will not be subject to Title V of the CAAA (ICAPCD Rule 900).

<u>New Source Review and Emission Offsets</u>:

Rule 207 of the ICAPCD regulations requires the preconstruction review of new or modified stationary sources to ensure that a project will not interfere with the attainment or maintenance of ambient air quality standards. This rule also states that no net increase in emissions to the air basin will be allowed from new stationary sources with the potential to emit 137 pounds per day (equivalent to 25 tons per year) or more of any nonattainment pollutant or its precursors. Rule 207 also requires that emissions in excess of the 137 pound per day limit be "offset" with an actual reductions of the same pollutant or its precursors. These offsets can be obtained from another source at the same location, and offset at a ratio of 1:1, or

from another source up to 50 miles away at a ratio of 1.2:1. Based upon the emission estimates presented in Table 4-5, which are maximum, not anticipated, emission levels, the Proposed Action will not emit more than 25 tons per year of any nonattainment pollutant or its precursors.

Best Available Control Technology/Reasonably Achievable Control Measures:

Rule 207 of the ICAPCD regulations also requires the application of Best Available Control Technology (BACT) to any new (stationary) emission unit which has the potential to emit 25 pounds per day (approximately 4.5 tons per year) of any nonattainment pollutant or its precursors. The Project contains no applicable emission unit which produces more than 1 ton per year, and thus is not subject to BACT requirements.

ICAPCD Regulation VIII (Fugitive Dust Requirements for Control of Fine Particulate Matter) requires the implementation of Reasonably Available Control Measures (RACM) to reduce the amount of PM_{10} entrained in the ambient air as a result of emissions generated from anthropogenic (man-made) fugitive dust sources generated from within Imperial County. RACM must be applied to any active operation, except as specifically exempted in the regulations. Because the silt content of both the Project ore and waste rock is less than five (5) percent, and most other activities which would generate fugitive PM_{10} are specifically exempted from Regulation VIII, only the use of internal roads for traffic and hauling; the discharge of the lime to the ore trucks; and the soil stockpiles are subject to RACM for PM_{10}. For each of these activities, the Proposed Action already contains one (1) or more of those measures required as RACM: the haul and maintenance roads are watered at least once per day; the lime discharge to the ore trucks is controlled by water sprays; and emissions from the soil stockpiles are controlled through the application of vegetation. Therefore, there is no regulatory requirement for the implementation of any additional measures to reduce emissions of fugitive PM_{10}.

Compliance with Ambient Air Quality Standards:

The principal pollutant of concern emitted by the Project is PM_{10} because of the relatively large quantity of PM_{10} emitted by the Project, the relatively low ambient air quality standard for PM_{10}, and the fact that ~~over 90 percent of~~ nearly all of the Project PM_{10} emissions are from fugitive and mobile sources which are emitted throughout the Project mine and process area. In order to estimate the ambient air concentrations of PM_{10} which may result from Project emissions, computer-aided dispersion modeling for the Project PM_{10} emissions was conducted (see Appendix L). The modelling was conducted with the U.S. EPA Industrial Source Complex - Short Term (ISCST3R) dispersion model, which utilized the Trinity Consultants, Inc. Breeze "graphical front end" (IBM-PC Version 3.00, dated 96113 ~~95250~~). Using U.S. EPA's regulatory default model options and rural dispersion parameters with elevated terrain, emissions from Project were modeled based on hourly emission rates calculated in Appendix L and summarized in Table 4-5 for all sources (fugitive, point, mobile and other) of PM_{10} within the Project mine and process area. Surface meteorological data for the year 1989 from the National Weather Surface (NWS)-operated Yuma Air Station, combined with upper-air data from the NWS-operated Tucson Upper Air Station was used, as it provided the most readily and reasonably available dataset for the modeling.

Three (3) cartesian receptor grids were modelled, as well as a set of discrete receptors placed at 50-meter intervals along the Project mine and process area perimeter fence: a 19-by-19, 1,000-meter spacing, receptor grid, centered on the Project mine and process area which covered approximately 125 square miles; a 21-by-21, 250-meter spacing, receptor grid, also centered on the Project mine and process area, which covered the area closer to the perimeter fence with a finer grid; and an 11-by-21, 100-meter spacing, receptor grid, located over the southwest corner of the Project mine and process area, which covered the area outside the perimeter fence which the other model runs indicated had the highest ambient concentrations. A complete discussion of the modeling conducted, including the parameters used in the model runs and a discussion of the metereological data, is contained in Appendix L to this EIS/EIR.

The computer-calculated maximum ambient 24-hour PM_{10} concentration located at any point on or outside of the perimeter fence

was ~~4.3 5.3~~ 29.6 $\mu g/m^3$, located on the perimeter fence near the southwest~~2~~ corner of the Project mine and process area. Calculated maximum annual PM_{10} concentrations were ~~only 2.8 30.0~~ 5.3 $\mu g/m^3$, also located on the perimeter fence at a point near the southwest~~2~~ corner of the Project mine and process area. Both of these values are ~~well~~ below the applicable California and federal AAQSs (see Table 3-5), even when the background level calculated from the Mesquite Mine (19.9 $\mu g/m^3$) is added. Calculated ambient concentrations at distances greater than ~~2,000~~ 3,750 meters (~~1.2~~ 2.3 miles) from the Project mine and process area boundary were universally below ~~1~~ 5 $\mu g/m^3$. Maximum ambient concentrations at the northern boundary of the Ft. Yuma Indian Reservation, a distance of 12,000 meters (7.5 miles) from the southern boundary of the Project mine and process area, would be far below 1 $\mu g/m^3$ and impossible to distinguish from background concentrations.

Computer modelling of Project emissions to estimate maximum ambient air concentrations of criteria air pollutants other than PM_{10} has not been undertaken. However, some general observations regarding the potential ambient air quality impacts resulting from the Proposed Action activities within the Project mine and process area may be inferred through comparisons with modelling done for on-site activities for the proposed Mesquite Regional Landfill (U.S. Bureau of Land Management, 1994a). Because the emissions of gaseous pollutants are comparable between the two projects (Project-to-landfill ratios are ~~1.81:1~~ 1.22:1 for NO_2; ~~1.93:1~~ 1.64:1 for SO_2; and ~~1.05:1~~ 1:1.32 for CO); the ratios of stationary to fugitive emissions generally similar; and the maximum, off-site, ground-level concentrations of the gaseous air pollutants calculated for the landfill in the reference year (year 16) are so low compared to the regulatory standards (all are less than two (2) percent of the regulatory standard), emissions of NO_2, SO_2, or CO by the Proposed Action are very unlikely to violate any applicable ambient air quality standard for these pollutants.

<u>Exposure of Sensitive Populations</u>:

Project air pollutant emissions will produce very modest increases in the ambient concentrations of both criteria air pollutants and HAPs in the immediate vicinity of the Project mine and process area. However, the Project mine and process area is far removed from any resident population, sensitive or otherwise, which could be exposed to any long-term increase in the ambient concentrations of either

criteria air pollutants or HAPs. Transient populations (i.e., recreational visitors) could be exposed to these minor increases in ambient air concentrations if in the immediate vicinity of the Project mine and process area, although this exposure would be of very short duration and would not be significant.

4.1.4.3. Mitigation Measures

Incorporated by Project Design:

- 4.1.4-1: Water sprays, chemical treatments acceptable to the BLM, or other RACM determined acceptable by the ICAPCD shall be applied to the haul and maintenance roads within the Project mine and process area to minimize the generation of fugitive PM_{10}. If water sprays are used, they shall be applied no less than once per day on days without precipitation unless road surface moisture is documented as sufficient to suppress fugitive dust emissions without additional water.

- 4.1.4-2: Project employees, contractors, and visitors shall be advised of the need to adhere to speed limits to minimize the generation of fugitive dust.

- 4.1.4-3: Shrouding of the lime discharge to the ore trucks and prompt revegetation of the soil stockpiles, or equivalent RACM for these fugitive PM_{10} emissions, shall be implemented and maintained.

- 4.1.4-4: Water sprays or chemical treatments acceptable to the ICPWD shall be applied to Indian Pass Road from its intersection with Ogilby Road to the boundary of the Project mine and process area with sufficient frequency to minimize the emissions of fugitive PM_{10} from Project traffic on Indian Pass Road.

Incorporated by Regulation:

- 4.1.4-~~4~~5: All permits required by the ICAPCD shall be obtained, and all operations conducted in general compliance with the conditions of these permits.

Incorporated to Avoid Potentially Significant Effects:

- 4.1.4~~-5~~-6: All disturbed surfaces no longer needed for project activities shall be reclaimed as soon as practical to minimize fugitive PM_{10} emissions from wind erosion.

4.1.4.4. Unavoidable Adverse Effects and Level of Significance After Mitigation

Project emissions of criteria air pollutants and HAPs will produce minor increases in the ambient concentrations of both these air pollutants in the immediate vicinity of the Project mine and process area. Application of the recommended mitigation measures will reduce the impacts of all HAPs and all criteria air pollutants to insignificance.~~,~~

4.1.5. Biological Resources

This assessment of the effects of the Project on biological resources is based on the findings described in several biological technical investigation reports of the Project area which are appended to this EIS/EIR as Appendices F, G, H, and I. A summary of the findings of the biological surveys is provided in Section 3.5.6.2. In addition, the findings of a Biological Assessment of the anticipated effects of the Project on the federal and state listed and proposed biological resources in the Project area, prepared on behalf of the BLM (Rado, 1996), have been summarized in this assessment, and the recommended mitigation measures provided in the Biological Assessment have been integrated with measures provided in this EIS/EIR.

4.1.5.1. Assumptions and Assessment Guidelines

To determine the potential significance of the effects of the Project on biological resources, it is necessary to consider the relative importance of the identified biological resources in the vicinity of the Project area and the degree of potential Project-related impacts on these respective resources. As discussed in the regulatory framework for biological resources section of this EIS/EIR, factors utilized to determine the relative importance of the biological resources in the vicinity of the Project are, in part, based on species and habitats afforded protection under both the federal Endangered Species Act (ESA) and the California Endangered Species Act ~~(CECA)~~ (CESA), as well as BLM sensitive species, and other species of concern,

collectively referred to as special-interest species for the purposes of this assessment (see Section 3.5.1).

Based upon NEPA and CEQA guidelines, and commonly accepted criteria, a project would normally be considered to have a significant effect on biological resources if it could:

- Substantially affect a rare or endangered species of animal or plant or the habitat of the species;
- Interfere substantially with the movement of any resident or migratory fish or wildlife species; or
- Substantially diminish habitat for fish, wildlife, or plants.

4.1.5.2. Impacts of the Proposed Action on Vegetation

The Project would impact vegetation primarily through direct destruction of plants by surface disturbance during construction of the mine and ancillary facilities. An estimated ~~1,400~~ 1,392 acres of surface disturbance would result from development of the mine pits, Mineral Potential Area, heap pad, waste rock stockpiles, soil stockpiles, process ponds, haul roads and access road realignment, drainage diversions, well field and pipeline, electrical power line, and ancillary facilities. The surface locations of these facilities are identified on Figure 2-2, and the surface acreage occupied by these principal mine facilities is identified on Table 2-1.

Surface disturbance would occur incrementally throughout much of the life of the Project as individual pits are mined and waste rock stockpiles, soil stockpiles, and process facilities are expanded. Vegetation would be lost as result of: (a) initial surface blading of vegetation, ore processing, stockpiling of soil and waste rock, and construction of surface facilities and access corridors; (b) crushing or damage to vegetation as a result of heavy equipment use and vehicle use and parking; (c) periodic mine exploration activities; and (d) the use of heavy equipment during site reclamation activities. Vegetation existing in the areas of surface disturbance would be destroyed or damaged as a result of removal, crushing, entombment, soil compaction, or root damage.

Vegetation recovery is a function of the type and degree of soil disturbance. Disturbed or compacted soils associated with construction or human activity may take longer to recover than soils disturbed by natural disturbances (i.e., such as flooding), in part because seeds, and perhaps related symbionts (e.g., rhizobial bacteria), may no longer be present (Virginia and Bainbridge, 1987). Revegetation strategies would be implemented to reduce the time involved for natural plant establishment on land disturbed by the Proposed Action. Examples of strategies in desert revegetation studies include soil preparation, (scarification and topsoil restoration), reseeding, transplantation, and plant protection (see Reclamation Plan, provided as Appendix ~~C~~ A). Application of these strategies within the Project area would continue during the life of the revegetation program.

As discussed in the Reclamation Plan, the Project applicant has developed a revegetation program based upon experience gained from revegetation efforts at its Picacho Mine and information provided by qualified experts on desert flora and revegetation. Elements of the revegetation program include:

- Salvaging and stockpiling available soils from the mine and process area for redistribution over disturbed areas during site reclamation.
- Contouring and grading of surfaces to prevent erosion and to promote seed germination. Water catchment basins would be constructed for revegetation on the tops and accessible slopes of the waste rock stockpiles, heap, and permanent diversion channels.
- Monitoring of revegetation plots at the nearby Picacho Mine and concurrent activities at the Project area to adapt successful seeding and revegetation procedures to the revegetation program.
- Collection of a seedbank of seeds from sources within, and in the vicinity of, the Project area to be used to reseed the Project area during site reclamation. Primary seed sources will consist of: (a) seeds in the surface soils salvaged during mine construction from shallow washes; and (b) seeds obtained from selected plant species within, and in the vicinity of, the mine

and process area which would be hand-collected over the life of the Project.

- Preparation of the seedbed to optimize conditions for seed germination.

- Documentation of seed mixtures, seed rates, and application methods demonstrated to be effective in the vicinity of the Project. Seed mixtures would use seeds collected from the immediate area supplemented with additional seeds of plant species approved by the BLM, Imperial County, and the CDFG to increase available deer browse.

- Adopting a schedule for seeding and transplanting selected plant species which optimizes the potential for revegetation success.

- Monitoring for invasion of noxious weeds and salt cedar (*tamarisk* sp.) and implementing a weed control and noxious plant removal program acceptable to the BLM and Imperial County.

- Adopting revegetation goals acceptable to the BLM and Imperial County which target vegetative cover, vegetative diversity, and vegetative density to determine the success of the revegetation program. Revegetation efforts would be amended, as necessary, to reflect the findings of the monitoring activities.

- Implementing a monitoring program to evaluate the success of the revegetation program and a schedule for reporting the findings of the monitoring activities to the BLM and Imperial County.

The Project measures summarized above, and discussed in the Reclamation Plan, would mitigate to a level of nonsignificance the effects of surface disturbance from mine construction and operations on the vegetation within the Project mine and process area.

Up to 1,200 afy of ground water would be produced from the Project ground water well field for use in mining operations. The static elevation of the ground water in the alluvial production reservoir has been measured at 540 feet below ground surface (WESTEC, Inc., 1996). The water table is far below the depth that surface vegetation

could be utilizing the ground water; therefore, anticipated drawdown and lowering of the ground water elevation as a result of the proposed ground water production would not impact surface vegetation. Moisture available from watering of roads and other traffic areas for dust suppression during construction and mining activities could result in a temporary increase in some opportunistic plant species immediately adjacent to active roadways or other watered surface areas.

Similarly, new low spots or drainage areas where water could pond or accumulate within the active portions of the Project mine and process area could result in the introduction of salt cedar or other noxious weeds. Salt cedar could also invade moist pit areas following the completion of active mining activities where water may accumulate; however, these conditions are not expected to exist following the completion of mining (see Section 4.1.3.2.2). Seasonally moist areas within the remnant East Pit could result in small areas (estimated at less than one (1) to two (2) acres of pit bottom) in which salt cedar growth might be supported (Personal Communication - Samuel A. Bamberg, Ph.D.; April 25, 1996).

Of the total ~~1,400~~ 1,392 acres of surface disturbance, an estimated ~~1,300~~ 1,292 acres of the sparse, widely-distributed shrub/scrub vegetation, dominated by creosote bush, characteristic of the upland areas within the Project area, would be affected. The remaining area of surface disturbance, approximately 100 acres, would impact the shrub/tree vegetation (i.e., microphyll vegetation) characteristic of the primary washes and secondary drainages within the Project mine and process area.

Microphyll vegetation also exists in the wash systems downgradient of the Project mine and process area. Concern exists that diversions of the ephemeral drainages around the mine facilities would change the flow of water through the drainages feeding the vegetation in the downgradient wash systems. There is also concern that changes to ephemeral drainages would increase erosion or affect fluvial processes in the streambeds resulting in increased sedimentation or changes in the quality of water flowing through the Project area.

Under the Proposed Action, storm waters in the major ephemeral drainages would either be allowed to flow naturally through the Project area, or would be diverted into channels around the Project facilities and returned to the natural watercourses downgradient of the

Project mine and process area. Each of the diversion channels would be designed to channel the surface flow back into the same major downstream ephemeral drainages from which the flow originated (see Section 2.1.9.7). The permanent channels through the Project mine and process area would be built to approximate the original drainage system in both gradient and channel geometry ~~restored~~ to prevent erosion and ~~would be~~ revegetated with microphyll vegetation.

The Project design measures described above would mitigate to a level of nonsignificance the effects on downstream vegetation from any potential changes in ephemeral stream flow and fluvial processes.

4.1.5.2.1. Impacts to Threatened or Endangered Plant Species

No federal or California listed, proposed, or ~~candidate rare, threatened or endangered~~ special status plant species were observed during the botanical surveys of the Project area. Based on the findings of the site surveys and prior database records, no listed, proposed, rare or ~~candidate~~ special status plants would be affected by this Project.

4.1.5.2.2. Impacts to BLM Sensitive Plant Species

~~Fairy duster:~~ One BLM sensitive plant species, fairy duster, was observed along the edges and banks of the smaller (2- to 8-foot wide) ephemeral drainages within the Project area and in ephemeral drainages throughout the vicinity of the Project area. Individual fairy duster plants would be destroyed and their seed bank potentially lost (i.e., the dormant seeds left by previous years' plants would be buried) as a result of the proposed grading and development activities within the Project mine and process area. Fairy duster occurs over a large geographic area, including the Colorado, eastern Mojave, and Sonoran Deserts. Based on surveys of the Project area, an estimated 500+ plants occur within the Project mine and process area. Since most of the smaller ephemeral drainages in the Project mine and process area would be destroyed as a result of mine construction, essentially all of these fairy duster plants would be ~~loss~~ lost. However, the species is locally common, and can recolonize washes previously disturbed by mining operations (Environmental Solutions, 1987). In addition, design

elements of the Project provided in the Reclamation Plan include the collection of seeds, including fairy duster seeds, from the wash soils for use during reseeding during site reclamation activities. The impact resulting from the loss of individual fairy duster plants within the Project mine and process area is considered to be below the level of significance. While the effects of the Project on the fairy duster would be below the level of significance, measures have been incorporated into the Project design to further reduce the long-term impacts of the Project on this species (see Section 4.1.5.4).

4.1.5.2.3. Impacts to CNPS List 4 Species

One CNPS List 4 ("watch" list) species, the winged ~~forget-me-not~~ cryptantha, was observed within the Project area. This species was reported to exist in low numbers along the banks of the larger ephemeral drainages. Fewer than 60 individual plants were estimated to exist within the Project mine and process area (Rado, 1996). These plants would be destroyed and their localized seed bank within the mine and process area would be potentially lost as a result of surface disturbance during mine construction or processing. This species is widespread in distribution, ranging from the southeastern desert in California into Arizona and Nevada, but it is typically encountered in low densities and numbers of individual plants. The CNPS List 4 status indicates that these plants are not "rare" but are sufficiently uncommon that their status should be monitored. Given the current status and the distribution of the winged ~~forget-me-not~~ cryptantha, the impact from the loss of the observed plants within the Project mine and process area would not exceed the level of significance. While the effects of the Project on the winged ~~forget-me-not~~ cryptantha would be below the level of significance, measures have been incorporated into the Project design to further reduce the impacts of the Project on this species (see Section 4.1.5.4).

4.1.5.3. Impacts of the Proposed Action on Wildlife

4.1.5.3.1. Impacts on Wildlife Habitat

The total area of surface disturbance resulting from Project construction and operation would be ~~1,400~~ 1,392 acres. This would include approximately ~~1,300~~ 1,292 acres of desert scrub habitat and approximately 100 acres of microphyll woodland habitat. The loss of wildlife habitat, particularly the loss of microphyll woodland habitat, would directly or indirectly displace resident birds within or near the Project mine and process area. The Project would also result in an incremental loss of foraging habitat for wildlife ~~and\ or~~ and/or migratory species such as bats and raptors. The effects of the loss of habitat from the Project on wildlife would continue over the life of the Project, and some of the effects would continue for an extended period following site closure. Wildlife would eventually return to the Project area as vegetation re-establishes and disturbed surfaces are reclaimed or recover. However, the projected period before conditions return to an approximate pre-Project status with respect to wildlife carrying capacity may exceed several decades following completion of the active life of the Project (Rado, 1996).

As discussed in Section 3.5.6, the CDFG considers microphyll woodland to be a sensitive habitat. It is considered second only to riparian habitat in wildlife diversity in the desert area, and it is considered a particularly important habitat component to deer and other wildlife species (Personal ~~communication~~ Communication - Nancy Andrew, CDFG). ~~The agency~~ CDFG has a policy for requiring replacement of habitat ~~on-site~~ "on-site" and "in kind" when possible for wetland habitat impacted as a result of proposed projects~~, or requiring habitat offsite "in kind" when on-site habitat replacement is not possible~~. This means that sensitive wetland habitat lost within a proposed project area as a result of proposed project activities would be required to be replaced by the project proponent with the same type and quality of sensitive wetland habitat somewhere within the project area when possible, or outside of the project area when on-site replacement is not possible. Wetland habitat would not be impacted by the Imperial Project, but the CDFG also attempts to adapt this wetland habitat policy

to other ~~sensitive~~ habitats which they consider sensitive, such as microphyll woodland, when evaluating measures to mitigate the biological effects of projects which may require Stream Alteration Agreements (Personal ~~communication~~ Communication - Lilia Martinez, CDFG, 1996). Surface disturbance from the Imperial Project would result in the destruction of approximately 100 acres of microphyll woodland habitat within the Project mine and process area. Diversions of surface drainage through constructed channels around the Project facilities would continue to provide the same flow and quality of water into the wash systems downgradient of the Project mine and process area as exists prior to mine construction. As such, no significant impact on wildlife habitat or species in the wash system downgradient of the Project mine and process area is expected. Similarly, wildlife which may exist in the Algodones Dune foothill "pockets" of microphyll vegetation downgradient of the mine would not be affected by the Project.

The through-flowing surface drainages would be located as close to their original courses as reasonably possible in comparably-sized channel(s) which would tie into the original downgradient wash systems. As discussed in Section 4.1.5.2, the permanently diverted drainages would be revegetated with microphyll vegetation. Following site reclamation, approximately 50 acres of microphyll woodland would be restored. However, as a result of Project construction, some of the affected microphyll woodland acreage cannot be restored within the Project mine and process area, and there would be a net reduction of approximately 50 acres of microphyll woodland in the Project mine and process area as a result of the Project.

~~The initial destruction and subsequent net loss of microphyll woodland habitat as a result of the Proposed Action is considered a significant effect. However, as presented in Section 4.1.5.4, mitigation measures have been proposed to reduce the adverse effects of the Project on microphyll woodland habitat. With the implementation of the proposed mitigation measures, the mitigated effect of the Project on microphyll woodland habitat would be below the level of significance.~~

Measures are incorporated into the Project design to minimize the area of microphyll woodland habitat disturbed by the Project to 100 acres and to mitigate the adverse effects of the Project on microphyll woodland habitat. Site reclamation measures would result in restoration of approximately 50 of these acres of microphyll woodland habitat. However, the initial destruction of approximately 100 acres of microphyll woodland habitat and the ultimate net loss of approximately 50 acres of microphyll woodland habitat from the Project area is considered a significant effect. Mitigation measures are provided for the acquisition of off-site private lands to compensate for the loss of habitat resulting from the Project (see Section 4.1.5.4). Additional measures to mitigate and compensate for the impacts of the Project on the intermittent stream channels and associated microphyll woodland habitat are anticipated as a result of the required Stream Alteration Agreement between the Project Applicant and the CDFG (see Section 4.1.5.4). With the implementation of these mitigation measures, the mitigated effect of the Project on microphyll woodland habitat would be below the level of significance.

4.1.5.3.2. Impacts on Wildlife

Wildlife species which inhabit, move through, or forage within the approximately ~~1,400~~ 1,392 acres of surface area to be disturbed within the Project area would be subject to increased mortality or displacement. Increased mortality would result from direct physical impacts or entombment during construction or processing activities; or indirect mortality from stress or increased predation pressure resulting from displacement into offsite areas.

Over the life of the Project, additional injuries and mortality to wildlife would be expected to result from impacts with motor vehicles commuting to the Project area and other equipment traveling to and from the Project mine and process area and the ancillary area. Experience in other remote areas suggests that reduced speed limits on public roads as a measure to minimize inadvertent vehicle impacts with wildlife is impractical to enforce. Individual animals could also be subject to: (a) drowning in mine process fluid impoundments;
(b) increased mortality from exposure to process chemicals

within the solution ponds; (c) injury or mortality during on-site blasting and continued mining operations and exploration activities; and (d) increased mortality from project-related stresses, including night lighting, continuous noise and human activity, or restricted movement in the vicinity of the Project mine and process area. Some species might also come under increased pressure from opportunistic predators (i.e., ravens, coyotes and kit foxes) attracted to the Project area by increased water availability, refuse, or noise.

Noise-sensitive species would be expected to avoid both the Project area and neighboring areas over the life of the Project, but would be expected to return to the area when noise generating operations are discontinued. Similarly, species intolerant of surface disturbance and human activities would also be expected to avoid the Project area and neighboring areas over the life of the Project.

An existing section of transmission line would be upgraded and a new transmission line would be constructed to provide electrical power to the Project mine and process area. Temporary and short-term impacts on wildlife would occur during pole placement and line stringing activities as a result of minor surface disturbance and human presence. The transmission line could also increase the availability of potential perch sites for bird predators in the area which could result in an increase in predatory pressure on wildlife species comprising the prey base for predatory birds in the area. The transmission lines would also increase the potential for collisions or electrocutions of raptors and other bird species.

The Proposed Action would result in the excavation of three (3) open pits, only one (1) of which would be backfilled with waste rock. The surface area of the open Singer Pit would be approximately 34 acres; the East Pit would remain as an approximately 227-acre excavation. Individual terrestrial wildlife species could become injured or killed by falls within these retained open pits. ~~In addition, wildlife species could be exposed to excessive predation levels should surface water accumulate in the bottom of the pits.~~ Should surface water accumulate in the bottom of the pits, wildlife species coming to

drink could be exposed to predators who may use the pit areas as a place to wait for prey.

The Project includes measures to prevent wildlife from entering process ponds, to minimize impacts from transmission lines, to discourage pit access by terrestrial species, to reduce the potential for the accumulation of surface water in the open pits, and to offset the reduced carrying capacity of the Project mine and process area to wildlife as a result of the net reduction of habitat as a consequence of the open pits (see Section 4.1.5.4). The effects of the Project on general wildlife species~~, except listed species and other species of concern which are discussed below,~~ would be below the level of significance. The effects of the Project on listed species and other special-interest species are specifically discussed below.

4.1.5.3.3. Impacts to Threatened or Endangered Wildlife Species

One species listed on both federal and California threatened species lists, the desert tortoise, would be directly impacted by the Project. A second wildlife species proposed for listing, the flat-tailed horned lizard, could also be subject to increased mortality or injury as a result of traffic to and from the Project area. No other listed or proposed species of wildlife were documented during site surveys or previously recorded in the Project area which would be impacted by the Project activities.

Desert tortoise: The habitats within the Project area are unclassified by the BLM with respect to desert tortoise, and the Project area has not been designated critical desert tortoise habitat by the USFWS (USFWS, 1994). However, as a result of field survey documentation of the tortoise within the Project area, the area is considered Category III tortoise habitat (BLM, 1989). The number of desert tortoise currently present within the Project area has been estimated from review of the site survey data to range between 33 and 57 individuals (Rado, 1996).

Desert tortoise which occupy the Project mine and process area may be injured or killed as a result of surface

disturbance during Project construction or processing activities. The surface modification activities would occur over approximately ~~1,400~~ 1,392 acres and would destroy the tortoise burrows or pallets within the area, potentially crushing or entombing individuals. Additional tortoises may also be injured or killed as a result of heavy equipment traffic within the Project mine and process area and from impacts with vehicles commuting to and from the Project area on existing roads. Tortoise occupying areas adjacent to the Project mine and process area, or having home ranges overlapping the Project area, would be similarly affected if they wander onto the active Project areas. A total of ~~1,139~~ 1,131 acres of desert tortoise habitat would be reclaimed following cessation of mining activities. Adjacent tortoise populations may slowly recolonize this area as vegetative processes establish native habitats. A total of 261 acres, comprising the East Pit and Singer Pit, would be lost as desert tortoise habitat after completion of Project reclamation.

Activities and facilities ancillary to the Project mine and process area could also adversely affect desert tortoises. Tortoises could be injured or killed as result of construction of the water pipeline or upgrading the electrical transmission line. The water pipeline would be buried, so it would not restrict tortoise movement. Construction or upgrade of the electrical transmission line may also attract, or provide perches for, tortoise predators (i.e., ravens). Storage ponds within the Project area or other sources of standing water and site refuse could also serve to attract and increase tortoise predator populations in the vicinity of the Project area. Following completion of mining activities, individual desert tortoises could wander into the East Pit or Singer Pit basins. While pit slopes (estimated at 50 degrees) may allow for the movement of animals, individual tortoises could become injured or killed as a result of falls or excessive predation from coyotes, kit foxes, or other species.

Desert tortoises within the Project area would also be subject to displacement either by capture and removal of individuals to locations outside the Project area, or by individuals within or near the Project area voluntarily leaving the vicinity when Project activities are initiated.

~~Prior to mitigation, the effects of the Project on desert tortoise would be considered significant. However, the Project includes design elements which would mitigate the impacts of the Project on the desert tortoise, and the BLM may require additional mitigation measures which would further reduce the impacts of the Project on the desert tortoise (see Section 4.1.5.4).~~ Some design elements have been incorporated into the Project to minimize the effects of the Project on desert tortoise. However, prior to mitigation, the effects of the Project on desert tortoise are considered significant. Mitigation measures are provided to further reduce the impacts of the Project on desert tortoise (see Section 4.1.5.4). The mitigated effects of the Project on desert tortoise would be below the level of significance.

Flat-tailed horned lizard: There were no flat-tailed horned lizards observed within the Project mine and process area during the biological surveys of the area, and no flat-tailed horned lizard habitat exists within the Project mine and process area or the Project ancillary area. There have been no recorded sightings of flat-tailed horned lizard within ten (10) miles of the Project area. However, there is a potential that a small number of flat-tailed horned lizards may be injured or killed as a result of Project-related traffic travelling along an approximately one-mile stretch of flat-tailed horned lizard habit located immediately north of the junction of Ogilby Road and Interstate Highway 8. While the effects of the Project on the flat-tailed horned lizard would be below the level of significance, mitigation measures to further reduce the impact of the Project on this species have been provided (see Section 4.1.5.4).

Peregrine falcon: No peregrine falcons were observed during surveys of the Project area, but a few falcons have previously been recorded from the Project area. Similarly, the species has been unreported in surveys for other projects in the general area (Condor, 1991; WESCO, 1992; Office of Arid Lands Studies, 1993; Western Resource Development, 1993; and DeDycker and Associates, 1994). Peregrine falcons are known to nest in cliff areas along portions of the Colorado River system (BOR, 1996). No potential nesting sites for peregrine falcons occur in the Project or surrounding area. The species could potentially utilize the area, including the Project mine and process area, for

foraging on an infrequent basis~~;~~ although, based on the absence of prior records, this seems highly unlikely. Project effects on the American peregrine falcon would not be significant.

Gila Woodpecker: A single gila woodpecker was observed perched on a large ironwood tree in a large wash near the southwest corner of the Project mine and process area by a biologist in January 1995 (Rado, 1995). Additional searches for this and other gila woodpeckers were subsequently conducted but did not record the bird in the Project area. The single observation of the Gila woodpecker is believed to have been of a transient bird. The gila woodpecker is a cavity nester known to prefer mature cottonwood and willow trees within riparian habitats not present in the Project area. The effects of the Project on the gila woodpecker would be below the level of significance.

4.1.5.3.4. Impacts to Other Wildlife Species of Concern

In addition to the listed species discussed above, the Project may adversely effect the following wildlife species of concern.

Cheeseweed owlfly: The cheeseweed owlfly has not been documented within the Project mine and process area. Since the Project occurs within the geographic range of this species, and because its host plant (creosote bush) is present, the cheeseweed owlfly could potentially occur here. If present, the cheeseweed owlfly would be subject to habitat loss associated with initial site blading and grading activities. Additionally, individual cheeseweed owlflies could be attracted to night lighting during operations; although, the species is considered a poor flyer (BOR, 1996). The geographic range of this species is extensive and collecting sites widely dispersed. The short flight season of adults and the indeterminate timing of adult emergence may reflect the paucity of records. The effects of the Project on the cheeseweed owlfly ~~would be below the level of significance~~ is unknown. The effects of the Project on the loss of potential cheeseweed owlfly habitat are considered below the level of significance and mitigation measures have been incorporated into the Project design to further reduce the long-term impacts of the Project on potential cheeseweed owlfly habitat.

Chuckwalla: Marginal quality chuckwalla habitat exists over approximately one-half of the Project mine and process area. A total of three (3) chuckwallas were observed during surveys of the Project area, and an estimated 25 individual chuckwallas may inhabit this area (Rado, 1995). Chuckwallas are known to display high site fidelity and would not be expected to flee the area as a result of site disturbance. As such, the chuckwallas present within the Project area could be killed or injured as a result of surface disturbance associated with mine construction and ore extraction and processing. Chuckwalla habitats are known to exist in the vicinity of Peter Kane Mountain north, Picacho Peak east, and the Cargo Muchacho Mountains south of the Project area. A large portion of the chuckwalla habitat exists within the Indian Pass and Picacho Peak Wilderness Areas. While the effects of the Project on the chuckwalla would be below the level of significance, measures have been incorporated into the Project design to further reduce the impacts of the Project on this species (see Section 4.1.5.4). Mitigation includes capture and relocation of chuckwallas in the Project mine and process area to suitable microhabit adjacent to the site. Given the low numbers of chuckwalla in the Project area, this measure should have no significant effect on the existing population of chuckwalla outside the Project mine and process area.

Loggerhead shrike: Loggerhead shrikes were frequently observed throughout the Project area during the biological surveys of the site (Rado, 199~~6~~5). Shrikes are common and widely distributed in the area. Two (2) family groups were observed within the Project area during the spring breeding period, suggesting a high likelihood that nesting occurs within the area, but no loggerhead shrike nests were encountered during the surveys. Based on a projected density of one loggerhead shrike per 50 acres, as was observed in the alluvial plain bordering the Santa Rosa Mountains, an estimated 33 shrikes may currently use the Project area for foraging and/or nesting. During site modifications and during construction and mining activities, approximately ~~1,400~~ 1,392 acres of shrike habitat would be impacted, displacing shrikes to neighboring unmodified lands. Individual loggerhead shrike nests may be destroyed, resulting in mortality to nestling birds or abandonment of eggs if site disturbance

occurs during the spring breeding period. Because of the availability of substantial offsite shrike habitat, the effects of the Project on the loggerhead shrike would be below the level of significance.

Black-tailed gnatcatcher: Black-tailed gnatcatchers were observed within the Project area during the biological surveys of the site. Favored gnatcatcher areas appeared to be in secondary drainages with wash vegetation in which young ironwood and palo verde trees provide cover (Rado, 1995). Gnatcatchers utilizing the Project mine and process area would be displaced to neighboring unmodified lands. Individual black-tailed gnatcatcher nests would be destroyed resulting in mortality to nestling birds or abandonment of eggs if site disturbance occurs during the breeding period. Because of the availability of suitable gnatcatcher habitat in neighboring areas, the effects of the Project on the black-tailed gnatcatcher would be below the level of significance.

Sharp-shinned hawk: A single sighting of a sharp-shinned hawk occurred in the Project area during the biological surveys of the Project area (Rado, 1995). This species is reported to be an uncommon winter migrant through the area. Implementation of the Project would result in a small reduction of the regional foraging habitat available to migrating sharp-shinned hawks, and it could result in a minor behavior modification of individual birds that cross the Project area. Based on the low frequency in which sharp-shinned hawks are projected to utilize the Project area, and the availability of offsite foraging habitat, the effects of the Project on the sharp-shinned hawk would be below the level of significance.

Northern harrier: Two (2) sightings of northern harriers were made within the Project area during the biological surveys (Rado, 1995). The sightings were during the fall and were attributed to isolated birds presumed to have been migrating through the area. There is no northern harrier nesting habitat within the Project area. The Project would result in a small reduction of the regional foraging habitat available to migrating northern harrier, and it could result in a minor behavior modification of individual birds that cross the Project area. Based on the low frequency in which northern harrier are

projected to utilize the Project area, and the availability of substantial offsite foraging habitat, the effects of the Project on the northern harrier would be below the level of significance.

LeConte's thrasher: LeConte's thrashers were not recorded during Project surveys, which included playing recorded bird calls during the breeding season in an attempt to elicit a response. However, prior records suggest that LeConte's thrashers may occur here (CNDDB, 1996; BLM records). If present, the species would be subject to habitat loss, displacement of individuals to offsite areas, and possible disruption of breeding and nest failure. Because of the availability of substantial offsite thrasher habitat, the effects of the Project would be below the level of significance.

Crissal thrasher: A single crissal thrasher was observed within the Project mine and process area during the surveys. The species is closely associated with drainages and wash "edge" vegetation. A total of about 100 acres of such habitats would be affected by Project actions. Crissal thrashers that utilize these drainages would likely be displaced into adjacent unmodified lands as a result of conversion of habitat. Depending upon timing of year, nests, may also be abandoned, resulting in mortality of nesting birds and/or abandonment of eggs. Because of the availability of substantial offsite crissal thrasher habitat, the effects of the Project would be below the level of significance.

Vaux's swift: Vaux's swifts utilize the general area, including the Project area, during spring and fall migration. They do not nest in this region. Site development may result in minor behavioral modification of migrating birds passing through the region. Mining activities would also result in a reduction of the available foraging/resting habitats for migrating birds. Because of the availability of substantial offsite swift foraging/resting habitats, the effects of the Project would be below the level of significance.

Golden eagle: Golden eagles were not observed during Project surveys. Eagle nesting sites are also absent from the Project area and vicinity. The species may utilize the general area, including the Project mine and process area, for foraging.

Project development would result in the incidental loss of ~~1,400~~ 1,392 acres of potential golden eagle foraging habitat. Based on the widespread availability of offsite foraging habitat for golden eagles, the effects of the Project on this species would be below the level of significance.

Prairie falcon: Site surveys did not document the occurrence of the prairie falcon. However, the prairie falcon has been previously recorded within the general area and could utilize the Project site and surrounding area for foraging (BLM records). Mining activities could result in the loss of ~~1,400~~ 1,392 acres of foraging habitat for prairie falcons. Based upon widespread availability of offsite foraging habitat, the effects of the Project on this species would be below the level of significance.

Cooper's hawk: Project site surveys did not document the occurrence of the Cooper's hawk. However, the species has been recorded as a seasonal visitor in the general area and could utilize the Project and surrounding area for foraging (BLM records). Mining activities could result in the loss of ~~1,400~~ 1,392 acres of foraging habitat for Cooper's hawk. Based on the widespread availability of offsite foraging habitats for Cooper's hawk, the effects of the Project on this species would be below the level of significance.

Long-eared owl: Project surveys did not document the occurrence of the long-eared owl. However, the species has been recorded as a seasonal visitor in the general area and could utilize the Project and surrounding area for foraging (BLM records). Based on the widespread availability of offsite foraging areas for long-eared owls, the effects of the Project on this species would be below the level of significance.

Barn owl: ~~The barn owl was not recorded during surveys of the Project area. Additionally, natural~~ Natural caves, fissures, old mine tunnels and shafts, or abandoned buildings often used for barn owl nesting are not present on within the Project area. Project development would potentially result in the creation of barn owl nesting within storage sheds, maintenance buildings, or other "open" structures. Since this species has been recorded in the general area (BLM records), Project development would result in the potential reduction of ~~1,400~~ 1,392 acres of barn

owl foraging habitat. Based on widespread availability of offsite foraging habitat for barn owls, the effects of the Project on this species would be below the level of significance.

~~Desert bighorn sheep: No bighorn sheep were observed within the Project area during the biological survey, and the Project area is not within bighorn habitat. Natural dispersal corridors, between Peter Kane Mountain to the north and the Cargo Muchacho Mountains to the south, lie several miles to the east of the Project mine and process area and would remain completely unaffected by the Project activities. The effects of the Project on bighorn sheep or bighorn sheep habitat would be below the level of significance.~~

Yuma puma: No pumas or sign were documented during surveys of the Project area. Use of the area by deer, a primary prey species for pumas, suggests that mountain lions may occur in the general area. Unconfirmed sightings of mountain lion in the region have been conveyed to the CDFG by hunters (Personal Communication - Rusty McBride, CDFG). Mining activities would result in the reduction of ~~1,400~~ 1,392 acres of foraging habitat potentially available to mountain lions. Associated impacts to deer could also incrementally affect the prey base for mountain lions. Based on the widespread availability of offsite foraging habitat for mountain lions, the effects of the Project on this species would be below the level of significance.

American badger: ~~One (1) American badger was observed about one mile north of the Project area boundary, and very limited badger sign were observed in the northeastern corner of the Project area during the biological surveys (Rado, 1995).~~ Badgers are presumed to utilize the Project area for foraging, but the actual number of badgers that may use the area is indeterminate. Previous studies of the species reported individual badgers having home ranges of 1,400 and 2,100 acres (Messick, 1987). Based on the area of these home ranges, few American badgers would be expected to ~~forage~~ occupy habitat within the Project area. The Project would result in a reduction of the habitat available to badgers ~~foraging~~ in the Project area, and increased noise, lighting, and traffic would likely result in behavior modifications by badgers to avoid the area. Based on

the ~~limited number of badgers which may forage in the area, and the~~ availability of offsite foraging habitat, the effects of the Project on the American badger would be below the level of significance.

Sensitive bat species: No ~~sensitive bat species were recorded during the biological surveys of the Project area, and no~~ sensitive bat species have previously been recorded on the site (Rado, 1995). No mine adits, caves, or large rock crevices exist in the Project area, thereby limiting the species of bats which may day roost on the site. However, some bat species could roost in trees or in small rock crevices. A supplemental focused assessment of the findings of the biological surveys with respect to bats was conducted by Patricia E. Brown, Ph.D. (see Appendix H). Dr. Brown concluded that five (5) sensitive bat species designated by the USFWS as Special Status Species and/or California species of concern (CSC) could conceivably roost and/or forage in the Project area, including: Yuma myotis, small-footed myotis, cave myotis, occult ~~myotis~~ little brown bat, and desert pallid bat. A larger number of additional Special Status Species/CSC bat species which would not roost in the Project area could use the Project area as nighttime foraging habitat, including: Townsend's big-eared bat, spotted bat, western mastiff, and California leaf-nosed bat.

Large numbers of bats would neither be killed nor displaced by the Project~~, but construction and surface disturbance would eliminate any potential bat roosting sites within the Project mine and process area~~. Foraging habitat would ~~also~~ be affected, but similar habitat is widespread around the Project area. Night lighting from the Project would attract insects and could result in a net increase in bats foraging in the vicinity of the Project area. This could lead to individual bat collisions with lights or drownings in ponds. However, based on the availability of offsite day roost areas and foraging habitat, the effects of the Project on sensitive bat species would be below the level of significance.

~~Deer~~Mule deer: Desert deer are widely distributed throughout

the Project area and surrounding area, but the deer population is reported to be low (Celentano and Garcia, 1984). Deer were observed to use the northeast-southwest trending wash channels as potential movement corridors and to also move cross-gradient over the upland areas and across the washes in the Project area toward the CDFG-maintained "guzzler" off of Hyduke Road south of the Project area (Personal Communication - T. Rado).

The Proposed Action would impact deer~~, and would~~ eliminate the use of the Project mine and process area by deer over the life of the Project, and would permanently eliminate the majority of the open pits from deer habitat. Without appropriate mitigation, Project-related impacts could result in lowered area carrying capacity and a slight net reduction in the numbers of deer that seasonally utilize the area, and/or that may reside in the area due to the availability of water in maintained guzzlers located south and also east of the Project mine and process area. Potential impacts to deer would include:

- The general loss of most of the Project mine and process area as foraging habitat, in particular, the approximately 100 acres of microphyll woodland habitat which would be destroyed during Project construction.

- To the extent the Project mine and process area serves as deer fawning habitat, the approximately 100 acres of microphyll woodland in the washes would be destroyed as potential fawning habitat during Project construction.

- Restricted access through the Project mine and process area as a result of fencing may limit deer movement in the vicinity of the Project mine and process area, and access routes to three (3) big game guzzlers located east and south of the Project mine and process area boundaries would be slightly reduced.

- Noise from equipment operation, blasting activities, and human presence, as well as night lighting of the Project mine and process area facilities, would be expected to inhibit deer activity in the immediate vicinity of the Project area.

- Vehicles commuting on roads to the Project mine and process area would increase the potential for vehicle impacts with deer and resulting injuries and mortality.

- Deer which penetrate the perimeter fence and/or interior barriers of the Project mine and process area would be subject to an increased potential for vehicle impact injuries and mortality and ingestion of potentially harmful process pond solutions or other chemicals stored and used on the site.

- Water could accumulate in the East Pit and attract deer to the new water source. Limited access to and from the pit could potentially serve as an opportunity for increased predation of deer.

Because of the low density and scattered distribution of deer in the area, the Project would not be expected to directly impact a large number of deer, but deer would be indirectly impacted by reduction of habitat quality through vegetation removal. The effects of the Project on deer would be below the level of significance. However, mitigation measures have been designed into the Project and are proposed which would further reduce the impact of the Project on microphyll woodland habitat and deer and other wildlife species which utilize the habitat (see Section 4.1.5.4). Elements of the Project design which would mitigate impacts on deer include:

- Constructing a 6-foot high, barbed-wire topped, chainlink fence around all Project created surface water sources within the Project mine and process area, including the heap leach pad, process facilities, and fresh water pond;

- Revegetating disturbed areas following mining activities, and including native deer forage plants as a part of this effort (subject to BLM and CDFG approval);

- Performing revegetation within the permanent diversion channels, including planting of young seedling palo verde and ironwood;

- Performing revegetation on selected adjacent drainages subject to historic damage unrelated to the Project;
- Diverting surface drainage back into the same major channels to maintain continuity of flow and water quality to habitat downstream of the Project mine and process area;
- Constructing a rock barrier around the remnant Singer Pit and East Pit;
- Constructing an offsite big game guzzler at a location in the vicinity of the Project area mutually agreeable to Chemgold, the CDFG and the BLM; and
- Constructing one or more on-site big game or small game guzzlers at the conclusion of site reclamation.

Desert bighorn sheep: No bighorn sheep were observed within the Project area during the biological survey, and the Project area is not within bighorn habitat. Natural dispersal corridors, between Peter Kane Mountain to the north and the Cargo Muchacho Mountains to the south, lie several miles to the east of the Project mine and process area and would remain completely unaffected by the Project activities. ~~The effects of the Project on bighorn sheep or bighorn sheep habitat would be below the level of significance.~~ No effects to desert bighorn sheep should occur as a result of the Project.

4.1.5.4. Mitigation Measures

Incorporated by Project Design:

- *The following measures have been incorporated into the Project design to reduce the general impacts to biological resources during the active life of the Project.*

  - 4.1.5-1: Applicant shall construct a fence ~~no less than four (4) feet in height~~ around the entire Project mine and process area. The fence shall be constructed no less than four (4) feet in height with 3-strands of smooth wire, or equivalent~~, and shall include tortoise exclusion fencing, in conformance with responsible agency requirements, to inhibit wildlife access to Project facilities~~. That portion of the perimeter fence constructed along the western boundary of the Project mine and process area, including all of the fenceline adjacent to Indian Pass Road (see Figure 2-2), shall be a chain-link fence, no less than six (6) feet in height, to restrict public access to the Project area. The entire perimeter fence shall include desert tortoise exclusion fencing, in conformance with responsible agency requirements, to inhibit wildlife access to Project facilities (see also Mitigation Measure ~~4.1.5-40~~ 4.1.5-38). Applicant shall ~~also~~ construct ~~an interior~~ a chain-link fence, no less than six (6) feet in height, with one (1) foot of barbed wire at the top, around the ore leach pad, process facilities, and fresh water pond to further restrict wildlife from accessing these facilities. Applicant shall routinely inspect and repair the fences, as necessary.

  - 4.1.5-2: Applicant shall prohibit cross-country use of vehicles and equipment except within those portions of the mine and process area subject to surface disturbance.

  - 4.1.5-3: Applicant shall cover the pregnant and barren solution ponds with either small-mesh nets; a solid, 40-mil, HDPE/polypropylene cover; floating plastic balls; or equivalent cover acceptable to the BLM to keep wildlife out of the ponds. Applicant shall maintain the cover over the life of the Project. Applicant shall keep records of all wildlife kills which may be associated with the use of cyanide by the project, including all

dead wildlife found in or adjacent to the ponds or heap. Observations of wildlife killed in the ponds or on the heap shall be reported to the BLM, CDFG, and the U.S. Fish and Wildlife Service (USFWS) ~~quarterly~~ monthly for evaluation and, if determined necessary, for possible imposition of additional mitigation requirements (see also Mitigation Measure 4.1.5-34).

- 4.1.5-4: Applicant shall advise Project employees, contractors, and visitors of the need to adhere to speed limits and to avoid any animals, including the desert tortoise, flat-tailed horned lizard, and deer which may be encountered on or crossing the road to and from the Project area.

- 4.1.5-5: Prior to completion of mining, Applicant shall conduct an assessment of the potential for a pit lake to form in the East Pit. If the assessment indicates a reasonable potential for a pit lake to form, Applicant shall backfill the East Pit to an elevation which would raise the floor of the pit to an elevation higher than the level of any pit lake which may be predicted to form from the inflow of ground water and, thereby, prevent the creation of an attractive nuisance for wildlife. The findings of the pit lake assessment shall be completed and submitted for approval by the BLM prior to the completion of mining activities.

- 4.1.5-6: Upon completion of mining activities, either a loose rock rubble barricade comprised of large boulders or other suitable material~~, or an alternative method acceptable to the BLM,~~ shall be constructed to prevent vehicular access and limit pedestrian access to the exposed open pit(s) by the public and terrestrial wildlife species. The proposed design for the barricade shall be completed and submitted for approval by the BLM and ICPBD prior to the completion of mining activities.

• *The following additional measures have been incorporated into the Project design to reduce the impacts on microphyll woodland habitat and associated wildlife which utilize this habitat.*

- 4.1.5-7: Applicant shall construct a fence ~~generally equivalent to the Project perimeter fence entirely~~, no less than four (4) feet in height with 3-strands of smooth wire, or equivalent, around the approximately 40-acre south-central portion of the central wash within the Project mine and process area which is not

intended to be disturbed by Project operations to prevent accidental surface disturbance of the microphyll woodland habitat in this internal area during mine construction and operation.

- 4.1.5-8: Applicant shall provide periodic drip irrigation over the life of the Project to enhance the establishment of ironwood and deer browse vegetation within the surface drainage identified by Mitigation Measure 4.1.5-7~~, as may be appropriate, to enhance the quality of microphyll woodland habitat in this drainage~~. Vegetation selected for enhanced deer browse establishment shall be comprised of species known to occur in the Project area. The composition of the seed mix and the design of the vegetation enhancement measures shall be submitted to the BLM for approval prior to implementation.

- 4.1.5-9: Applicant shall construct a big game guzzler in a design and location acceptable to the BLM and the CDFG in the general vicinity of the Project mine and process area to ~~mitigate the loss of~~ provide for more intensive use of the existing habitat ~~for~~ by deer and other wildlife. Applicant shall obtain the required permit from the BLM prior to guzzler construction.

- 4.1.5-10: Applicant shall provide periodic drip irrigation over the life of the Project to enhance the establishment of ironwood and deer browse vegetation along the western slopes and banks of the approximately 3,000-foot section of the existing ephemeral stream channel immediately adjacent to, but outside of, the east-southeast boundary of the Project mine and process area~~ as may be appropriate to enhance the quality of existing microphyll vegetation and available deer browse on this area of this channel~~. Vegetation selected for enhanced deer browse establishment shall be comprised of species known to occur in the Project area. The composition of the seed mix and the design of the vegetation enhancement measures shall be submitted to the BLM for approval prior to implementation.

- 4.1.5-11: Applicant shall conduct annual transect surveys of the major through-going ephemeral stream channels upstream and downstream of the Project mine and process area to monitor these drainages with respect to existing vegetation and microphyll woodland habitat and document any potentially

adverse erosional or depositional processes. The surveys shall also document any sightings of deer fawn, bighorn sheep~~ and any~~, mountain lion, or other species for which monitoring is specified by the BLM. An annual report of the transect surveys shall be prepared and submitted in an acceptable form to the BLM.

- 4.1.5-12: Applicant shall construct all stream channel diversions to divert flows back into the same major wash system and ensure the continuing flow of an equivalent pre- and post-Project quantity and quality of water through the major drainages to preserve the downstream microphyll woodland habitat within the drainages (see also Mitigation Measure ~~4.1.5-34~~4.1.5-33 and mitigation measures provided for surface hydrology [Section 4.1.3.1.3]).~~ Upon the completion of the backfilling of the West Pit, Applicant shall replace the diverted section of the major western stream channel to its approximate original location within the Project mine and process area.~~

- 4.1.5-13: Applicant shall implement the ~~site~~ Project Reclamation Plan in conformance with the requirements of the BLM and Imperial County. The Reclamation Plan shall include a program for revegetation of the permanent diversion channels, including the planting of seedlings ~~or~~ of young ironwood and palo verde and seeding of other microphyll vegetation typical of the pre-Project wash habitat (see also Mitigation Measure 4.1.5-17).

- 4.1.5-14 Applicant shall, as a part of final reclamation, construct one or more big game and/or small game guzzlers within the Project mine and process area in a design and location acceptable to the BLM and the CDFG to enhance the restored site as habitat for deer and other wildlife. Applicant shall obtain the required permit from the BLM prior to guzzler construction.

- 4.1.5-15 Applicant shall enter into a Stream Alteration Agreement with the California Department of Fish and Game (CDFG) as may be required pursuant to California Fish and Game Code Section 1603~~ (see also Mitigation Measure 4.1.5-?)~~. The agreement shall include those measures which CDFG and

Applicant agree may be necessary, or appropriate, to mitigate, and compensate for, the impacts of the Project on the stream channels and associated microphyll woodland habitat and wildlife. Measures which may be included in the Stream Alteration Agreement include:

(1) Applicant shall acquire title to offsite private lands with comparable microphyll woodland habitat, in a location acceptable to the CDFG and the Applicant, to compensate at a 1:1 ratio for microphyll woodland destroyed and not reclaimed as a result of the Project. Ownership of the acquired land shall be transferred to the CDFG for long term habitat management.

(2) Applicant shall construct and/or maintain over the life of the Project one or more additional big game and/or small game guzzlers in a design and location acceptable to the CDFG, Applicant, and BLM, as appropriate, to enhance the habitat for deer and other wildlife.

(3) Applicant shall perform reclamation activities on one or more offsite locations on land in the vicinity of the Project acceptable to CDFG, Applicant, and the BLM, as appropriate, to restore microphyll woodland habitat which has been adversely impacted by previous actions unrelated to the Project.

(4) Applicant shall either fund or conduct additional biological investigation(s) as may be acceptable to the CDFG and Applicant to develop additional data for future agency decisions reflecting the biological resources associated with stream channels in the general vicinity of the Project.

- *The following measures have been incorporated into the Project design to reduce the long-term impacts of the Project and to enhance site reclamation.*

  - 4.1.5-16: Upon completion of mining activities, Applicant shall remove all equipment and materials from the Project area. All diversion channel lining materials and rip rap shall be removed from the temporary diversion channels.

- 4.1.5-17: The ~~site~~ Project Reclamation Plan shall include the collection of both fairy duster seeds and winged ~~forget-me-not~~ cryptantha seeds and distribution of the collected seeds of both species within appropriate microhabitats within the Project mine and process area.

- 4.1.5-18: Applicant shall stockpile available soil from the wash channels to be disturbed within the Project mine and process area and store the soil for subsequent use during site reclamation activities.

- 4.1.5-19: Applicant shall salvage specimens of selected plant species from the Project mine and process area prior to construction to be utilized during Project reclamation, habitat enhancement activities, or other site reclamation needs. Plant species may include cactus, ocotillo, ironwood, palo verde, or other appropriate species identified by the BLM.

- 4.1.5-20: Applicant shall implement ~~a weed abatement program over the life of the Project for control of salt cedars (*Tamarisk sp.*) and other potentially noxious weeds that may invade the site. The weed abatement program shall include ordinary practices such as seasonal grubbing and the application of herbicides, as necessary.~~ weed control measures such that all introduced plants (e.g., salt cedar (*tamarisk species*), mustard, and other noxious weeds) will not become established within the Project area. Manual or mechanical means of control will be the preferred methods employed. Use of other methods (e.g., herbicides) will require approval by the BLM. The weed control measures shall be implemented when noxious weeds are visually identified on the site and shall continue over the life of the Project.

- 4.1.5-21: Applicant shall implement the revegetation program contained in the ~~site~~ Project Reclamation Plan approved by the BLM and Imperial County. The revegetation program shall include a test plot program, surface contouring and shaping, salvage and distribution of stockpiled soils, collection of a seedbank of seeds from within and in the vicinity of the Project area, preparation of seedbeds, seeding with approved mixtures of native plant species endemic to the area, planting of the plants salvaged from the area prior to mine construction,

monitoring for invasion of noxious weeds or salt cedar, and vegetation success monitoring.

- 4.1.5-22: Applicant shall integrate the revegetation program activities with other site stabilization and restoration activities required by the approved ~~site~~ Reclamation Plan (see also Mitigation Measures 4.1.5-12 and 4.1.5-13).

Incorporated by Regulation:

- 4.1.5-23: Applicant shall comply with ~~the applicable provisions of the Federal Endangered Species Act of 1973, California Endangered Species Act of 1984, Native Plant Protection Act of 1977, Migratory Bird Treaty Act, and the Bald Eagle Protection Act.~~ all of the terms and conditions of the Biological Opinion prepared for the Project by the U.S. Fish and Wildlife Service in response to the BLM request for formal consultation pursuant to Section 7 of the Endangered Species Act of 1973, as amended.

- 4.1.5-24: Project actions may also require a dredge and fill permit (404 permit) from the U.S. Army Corps of Engineers (ACOE). A permit is required in the event that proposed activities would entail the dredging or filling of materials into designated waters of the United States. The ACOE shall be contacted by Applicant to determine whether such a permit shall be required prior to the onset of any actions that would disturb site drainages.

- 4.1.5-25: The California Regional Water Quality Control Board, Colorado River Basin Region (CRWQCB) shall be notified by the Applicant of Project actions, and Applicant shall comply with CRWQCB requirements for obtaining Waste Discharge Requirements for proposed discharges to land and a general Storm Water Permit.

Incorporated to Avoid Potentially Significant Effects:

- *The following measures were identified in the Biological Assessment to mitigate the effects of the Project on biological resources (Rado, 1996). Each of these measures would be required by the BLM:*

General Measures to Protect All Species of Concern:

- 4.1.5-26: Applicant shall designate a field contact representative (FCR) who will be responsible for overseeing compliance with protective stipulations for listed species. The FCR shall have authority to halt all activities that are in violation of the stipulations. The FCR shall have a copy of all appropriate stipulations when work is being conducted at the site. The FCR may be a project manager, company environmental coordinator, contract biologist, or ~~a person designated by the agencies.~~ other person identified as responsible by the Applicant. Applicant shall provide the name and contact information of the FCR to the BLM and applicable responsible agencies prior to site construction.

- 4.1.5-27: Prior to the onset of surface disturbance activities by the Project, Applicant shall retain qualified biologist(s) acceptable to the BLM and the CDFG to inspect the Project mine and process area and capture and relocate any chuckwallas encountered to suitable microhabit (e.g., rock rubble, rock outcrop ~~and~~, exfoliating cracks or crevice areas) in the shortest distance possible between the outside of the Project mine and process area perimeter fence (not to exceed 1,000 feet) and the point of capture ~~within 1,000 feet outside of the Project mine and process area perimeter fence~~.

- 4.1.5-28: During mining activities, stockpiling of equipment and vehicles shall utilize those portions of the Project area that will be subject to permanent disturbance. Temporary or inadvertent disturbance to remaining portions of the area should be minimized by: staking, "flagging", or otherwise clearly marking the boundaries of the alignment; notifying employees of the specific areas, boundaries of the areas, and the need to avoid disturbance to remaining areas; and posting signs or erecting temporary fencing at access points to limit access to authorized vehicles and equipment only.

All employees shall be instructed that their activities shall be confined to locations within flagged or otherwise marked areas.

The area of disturbance shall be confined to the smallest practical area, considering extent and location of ore bodies, topography, placement of facilities and access roads, locations of sensitive species, public health and safety, and other limiting factors. To the extent practical, previously disturbed areas within the Project ~~site~~ mine and process area shall be used for the placement of equipment, work staging sites, or parking of vehicles.

- 4.1.5-29: Open pipeline trenches, test holes, or test trenches shall be regularly inspected by the ~~staff environmental coordinator or a contract biologist at~~ FCR, or qualified biologist acceptable to the BLM, a minimum of three (3) times per day. During excavation of trenches or holes, escape ramps consisting of loose earth deposited in the test hole or trench shall be placed to facilitate the escape of any wildlife species that may inadvertently become entrapped. Any animals discovered shall either be allowed to escape before activities resume or carefully removed from the pit or trench and allowed to escape. A final inspection of the open trench segment or hole shall also be made by ~~a qualified biologist~~ the FCR, or qualified biologist acceptable to the BLM, immediately prior to backfilling. Arrangements shall be made prior to the onset of maintenance or construction to ensure that listed wildlife species can be removed from the trench without violating any requirements of the federal or California Occupational Safety and Health Administration.

- ~~4.1.5-30: To prevent the creation of on-site colonies of California leaf-nosed bats or other sensitive bat species during active mining operations, and as a means of reducing the site "attractiveness" as a roosting area for these species, Applicant shall screen the openings of any shafts or tunnels constructed on the site during mining operations.~~

- ~~4.1.5-31:~~ 4.1.5-30: Toxic materials contained on the site shall be stored and used in a manner that prevents harm to desert tortoises and other wildlife species. Methods of containment will be approved by the BLM.

- ~~4.1.5-32:~~4.1.5-31: Nets or other suitable coverings shall be placed over all ponds containing toxic solutions to prevent contact by area wildlife species, including bats. These coverings shall be regularly inspected and maintained by Applicant for the duration of the Project. Methods of cover, inspection, and maintenance will be approved by the BLM.

- ~~4.1.5-33:~~4.1.5-32: Transmission pole design shall prevent any potential for the inadvertent electrocution of raptors (see also Mitigation Measure ~~4.1.5-45~~4.1.5-43). Transmission pole design will be approved by the BLM.

- ~~4.1.5-34:~~4.1.5-33: Project actions will require the realignment of sections of washes. Applicant shall develop a specific plan for agency approval that ensures maintenance of intermittent flood water flow down these realigned wash channels into unmodified drainage boundaries outside of the Project in order to preserve vegetation and wildlife habitat. Design of these sections of realigned wash shall also include appropriate dimensions and slopes to accommodate continued use by wildlife during mining operations and to facilitate revegetation. A specific plan shall be prepared by Applicant and submitted to the BLM for review prior to the onset of any activities that would result in disturbance to these drainages. Plan design shall include the vegetation of channel bypasses on the site with native species that include ironwood and palo verde in order to maintain continuity of washes, restoration and revegetation of drainages during site reclamation, and planting of ironwoods and palo verde in offsite drainages to enhance wildlife habitat. Any rip rap initially placed along drainages during mining activities shall be removed at the conclusion of mining operations during on-site reclamation.

Desert Tortoise Protection Measures:

- ~~4.1.5-35:~~4.1.5-34: Project employees involved with regular activities shall be required to take a threatened and endangered species education program. The program shall include information on the biology of listed and sensitive species and their occurrence in the Project area, measures being implemented for the protection of ~~this species~~ desert tortoise and

its habitats during Project activities~~;~~ and means by which individual employees can facilitate this process.

A program approved by BLM shall be employed. Wallet-size cards signifying completion of training shall be recommended to employees. All employees shall participate in the education program prior to commencing Project activities. New employees shall receive formal approved training prior to working on-site. The program shall typically last from between 30 minutes and one (1) hour and shall cover the following topics at a minimum:

- Distribution;
- General behavior and ecology;
- Sensitivity to human activities;
- Legal protection;
- Penalties for violation of State and federal laws;
- Reporting requirements; and
- Project mitigation measures.

► ~~4.1.5-36:~~4.1.5-35 Incidences of observations of desert tortoises and their sign during activities shall be conveyed to the ~~Project field supervisor~~ FCR during mining actions. Employees shall be notified that they are not authorized to handle or otherwise move any desert tortoises encountered.

► ~~4.1.5-37:~~4.1.5-36: Tortoises commonly seek shade during the hot portions of the day. During mine project activities, employees shall be required to check under equipment and vehicles prior to moving such. If tortoises are encountered, the vehicle shall not be moved until such animals have voluntarily moved to a safe distance away from the parked vehicle.

~~► 4.1.5-38: Mining employees shall exercise caution when commuting to the Project area. Speed limits shall be limited to the speed designated by the Imperial County Road Department to minimize the chance for the inadvertent injury or mortality to desert tortoises or other wildlife species encountered on the road. Subject to County approval and BLM concurrence, Applicant shall post speed limit signs along Indian Pass Road.~~

- ~~4.1.5-39:~~4.1.5-37: If desert tortoises must be moved from harm's way during any Project activities, the following procedures shall be implemented by persons authorized by the USFWS to handle desert tortoises:

  (1) Desert tortoises shall be handled only by an authorized tortoise handler and only when necessary. New latex gloves shall be used when handling each desert tortoise to avoid the transfer of infectious diseases between animals. Desert tortoises shall be moved the minimum distance possible within appropriate habitat to ensure their safety. In general, desert tortoises shall not be moved in excess of 1,000 feet for adults and 300 feet for hatchlings. An authorized tortoise handler should follow the general handling methods contained in the "Protocols for Handling Live Tortoises" (~~Arizona Game and Fish, *et al*, 1991~~USFWS, 1990).

  (2) Desert tortoises that are found above ground and need to be moved from harm's way shall be placed in the shade of a shrub. All desert tortoises removed from burrows shall be placed in an unoccupied burrow of approximately the same size as the one from which it was removed. All excavation of desert tortoise burrows shall be done using hand tools, either by or under the direct supervision of an authorized tortoise handler. If an existing burrow is unavailable, an authorized tortoise handler shall construct or direct the construction of a burrow of similar shape, size, depth, and orientation as the original burrow. Desert tortoises moved during inactive periods shall be monitored for at least two days after placement in the new burrows to ensure their safety. An authorized tortoise handler shall be allowed some judgement and discretion to ensure that survival of the desert tortoise is likely.

  (3) If desert tortoises need to be moved at a time of the day when ambient temperatures could harm them (less than 40 degrees F or greater than 90 degrees F), they shall be held overnight in a clean cardboard box. These desert tortoises should be kept in the care of an authorized tortoise handler under appropriate controlled

temperatures and released the following day when temperatures are favorable. All cardboard boxes shall be appropriately discarded after one use.

(4) All desert tortoises moved from harm's way shall be marked for future identification. An identification number using the acrylic paint/epoxy covering technique should be placed on the fourth costal scute (USFWS, 1990). No notching should be authorized.

To facilitate clearing the area of desert tortoises, excavation of burrows should begin no more than fourteen (14) days prior to the onset of surface disturbing activities, as long as a final survey is conducted within 24 hours of the onset of activities to ensure that desert tortoises have not returned to the work area.

- ~~4.1.5-40:~~4.1.5-38: In order to minimize any exposure risk to desert tortoises, a specially designed fence shall be constructed around all portions of the Project area containing pits, ponds, waste rock stockpiles, ore processing areas, maintenance areas, and surface facilities. ~~Fence~~ The final fence design shall be discussed with and found acceptable to the USFWS, BLM, and CDFG. The desert tortoise exclusion fence must meet the following preliminary design specifications:

(1) Fencing shall result in a non-breachable barrier, and its support structure may be comprised of a variety of materials;

(2) Galvanized ¼- to ½-inch diameter mesh and 36-inch wide hardware cloth shall be used; and

(3) The hardware cloth shall be buried 12 inches underground, extend at least 24 inches above the ground, and be firmly attached to the bottom of the perimeter fence and other wildlife exclusion fences.

- ~~4.1.5-41:~~4.1.5-39: Following fence installation, and prior to initiation of mining, authorized biologists shall conduct a complete (i.e., 100%) survey for desert tortoises within the fenced area. All tortoises found shall be marked and removed

from the fenced mine area for safe offsite release within 1,000 feet of the outside of the Project fence using protocols acceptable to the BLM, USFWS, and the CDFG.

- ~~4.1.5-42:~~4.1.5-40: At the conclusion of Project pre-activity surveys and the relocation of any desert tortoises outside of the Project fence, Applicant and an authorized tortoise handler shall prepare a summary report documenting the desert tortoise protection measures implemented. The summary report shall be submitted to the BLM.

- ~~4.1.5-43:~~4.1.5-41: Pipeline placement design outside of tortoise-proof fenced project boundaries shall allow for the unimpeded movement of tortoises and other small terrestrial wildlife species.

- ~~4.1.5-44:~~4.1.5-42: That portion of the transmission line corridor extending outside of the fenced Project mine and process area boundary shall be re-surveyed for desert tortoise burrows and pallets within fourteen (14) days preceding line upgrading/construction. Tortoise burrows and pallets encountered within the construction zone (if any) shall be conspicuously flagged by the surveying biologist(s) and avoided during power pole placement or existing line upgrading. Contingent upon the findings of the pre-survey for the transmission line upgrade/construction, a determination will be made by the BLM as to whether or not on-site desert tortoise monitoring will be required during the transmission line upgrade/construction activities.

- ~~4.1.5-45:~~4.1.5-43: Transmission pole design shall prevent any nesting or perching by ravens, a major predator of young desert tortoises (see also Mitigation Measure ~~4.1.5-33~~4.1.5-32).

- ~~4.1.5-46:~~4.1.5-44: Notification signs for the desert tortoise and speed limit signs shall be placed and maintained within the Project boundary by Applicant to reduce chances for inadvertent vehicle-induced injury or mortality to desert tortoises and other wildlife species. Applicant, with concurrence of County, shall also place these signs along Indian Pass Road leading to the Project mine and process area.

- ~~4.1.5-47:~~4.1.5-45: Applicant shall participate in the BLM desert tortoise program for acquiring offsetting lands in compensation for adverse modification of desert tortoise habitat. Under the BLM policy undesignated lands such as the Project area, where tortoises or tortoise sign are located, become Class III tortoise habitat. Within Class III habitat, an offsetting ratio of 1:1 (e.g., one (1) acre of land secured and protectively managed for each acre affected) is applied. Prior to the Record of Decision, Applicant shall determine the feasibility of acquiring 200 acres of suitable desert tortoise habitat which is also microphyll woodland habitat. This 200 acres of desert tortoise/microphyll woodland habitat should be in a location, and of a quality, acceptable to the BLM to concurrently provide mitigation for the loss of desert tortoise and microphyll woodland habitat from the Project area.

- *Other measures:*

  - ~~4.1.5-48:~~4.1.5-46: Trash and food items shall be contained in closed containers ~~and removed regularly from the mining site in order~~ to reduce attractiveness to opportunistic predators such as ravens, coyotes, and kit foxes.

  - ~~4.1.5-49:~~4.1.5-47: Firearms and pet dogs shall be prohibited from the mine site.

- *Monitoring:*

  In addition to the preceding mitigation measures for biological resources, the NEPA and CEQA Lead Agencies (BLM and ICPBD, respectively) will prepare and adopt a biological monitoring program as part of the mitigation monitoring plans required under the regulations implementing NEPA and CEQA (see Section 1.3.1 and Section 1.3.2, respectively). The mitigation monitoring plans will document what will be required for:

  (1) Compliance monitoring, to ensure Project compliance with mitigation measures adopted from the EIS/EIR or other sources into the respective agency decision documents. They may also contain requirements to implement;

(2) Effectiveness or success monitoring, to determine if mitigation measures required in the decision documents are achieving the intended environmental objectives; or

(3) Validity monitoring, to determine if required mitigation measures continue to be correct or of the appropriate level over time.

The biological monitoring program will be developed by the BLM and ICPBD in consultation with the Applicant, the USFWS, and the CDFG, and will be approved by the Lead Agencies as part of any respective decision to approve the Project.

4.1.5.5. Unavoidable Adverse Effects and Level of Significance After Mitigation

The Proposed Action would result in the unavoidable loss of approximately 100 acres of tree/shrub vegetation (desert wash microphyll woodland habitat) and approximately ~~1,300~~ 1,292 acres of shrub/scrub vegetation (desert succulent scrub habitat) over the life of the Project. A total of ~~1,139~~ 1,131 acres of this area would be subject to reclamation measures at the end of the Project life to restore wildlife habitat, but approximately 261 acres comprising the remnant East Pit and Singer Pit would be barricaded to prevent entry by terrestrial species. A total of 50 acres of microphyll woodland habitat would be lost and not restored at the completion of reclamation. The Proposed Action would also result in the unavoidable "incidental take" of an estimated 33 to 57 desert tortoises (a federal- and state-listed threatened species) currently occupying the Project area, principally through harassment and some through direct mortality. Other resident and non-resident wildlife species dependent on the habitat in the Project mine and process area would also be subject to displacement and ~~potential~~ increased mortality.

Measures are provided to mitigate the effects of the Project on vegetation, wildlife, and habitat. The mitigated effects of the Proposed Action on biological resources are below the levels of significance.

4.1.6. Cultural and Paleontological Resources

This section is based in part on the July, 1996 and September, 1996 cultural resource reports prepared for the Project area (ASM Affiliates, Inc., 1996a; ASM Affiliates, Inc., 1996b), the non-confidential portions of which ~~is~~ are provided as Appendix J-1 and Appendix J-2 of this EIS/EIR.

4.1.6.1. Assumptions and Assessment Guidelines

The Proposed Action would normally have a significant effect on the environment if it would:

- Disrupt or adversely affect a prehistoric or historic archeological site or a property of historic or cultural significance to a community or ethnic or social group; or a paleontological site except as a part of a scientific study; or

- Adversely affect cultural resources determined to be eligible or potentially eligible for the National Register of Historic Places.

Implementation of the Proposed Action would require local and state agencies to demonstrate compliance with CEQA, for which specific guidance regarding cultural resources is presented in Appendix J of the CEQA Guidelines. Federal agencies must demonstrate compliance with the National Historic Preservation Act (Public Law 89-665); 80 Stat 915; 16 U.S.C. 470; as amended) [NHPA], which requires actions similar to CEQA for the protection of significant cultural resources. Because Project activities would disturb only public lands managed by the BLM, the federal process would take precedence.

Section 106 of NHPA requires a federal agency with jurisdiction over a project to evaluate the effect of the proposed project on properties included on, or eligible for, the National Register of Historic Places (NRHP). Federal agencies must also provide the Advisory Council on Historic Preservation (ACHP) an opportunity to comment on the effects of the proposed project to these properties. The 1992 amendments to the law particularly strengthened Native American involvement in the process. Specific guidance for these actions are found in federal regulations at 36 CFR Part 800, and in the programmatic agreement between BLM, ACHP, and the California State Historic Preservation Officer (SHPO).

The first step in the process required under Section 106 is to identify the cultural resources within the project's "area of potential effect" (APE), which has already been completed through the Project area cultural resources inventory (see Section 3.6.2.3). Next, based in part upon information provided in the inventory report and the criteria found at 36 CFR Part 60.4, the BLM, in consultation with the SHPO, must evaluate each of the identified cultural resources and determine its eligibility for the National Register of Historic Places (NRHP). The criteria for determining the NRHP-eligibility of a cultural resource are as follows:

> "The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling and association and:
>
> "A. That are associated with events that have made a significant contribution to the broad patterns of our history; or
>
> "B. That are associated with the lives of persons significant in our past; or
>
> "C. That embody the distinctive characteristics or a type, period, method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
>
> "D. That have yielded, or may likely to yield, information important in prehistory or history."

No further action would be required under the Section 106 process for cultural resource sites determined not eligible for the NRHP. For cultural resources determined eligible for the NRHP, BLM, again in consultation with SHPO, must apply the Criteria of Effect [36 CFR 800.9(a)] to determine if eligible resources would be affected by implementation of the Proposed Action. If BLM determines that the Project will have no effect and SHPO concurs, then no further action is required under Section 106. If BLM determines that the Project will have an effect, then BLM must apply the Criteria

of Adverse Effect (36 CFR 800.9(b)). BLM could determine that the effect is not adverse to the NRHP-values of each site found eligible for the NRHP, and if SHPO concurs, then no further action is required under Section 106. If BLM determines that the effect is adverse, additional consultation with SHPO and the ACHP must occur. However, if the value of the NRHP site is strictly for archaeological, historical, architectural, or scientific research, it is possible to avoid an adverse effect determination by implementing a treatment program to recover and preserve these values. Such a treatment program must be reviewed by SHPO.

Because only the first step (inventory) of the Section 106 process has been completed to date, the results of the process cannot be presented here, but will be provided in the Final EIS/EIR for the Project. These results will include a summary of the cultural resources within the Project area determined eligible for the NRHP; the anticipated adverse impacts of the Proposed Action; and a summary of the proposed treatment plan necessary to mitigate the anticipated adverse effects of the Proposed Action.

4.1.6.2. Impacts of the Proposed Action

Since no paleontological resources have been found within the Project area, and none are believed present, the implementation of the Proposed Action would not have an effect on any paleontological resources.

Much of the Project mine and process area is expected to undergo direct impacts from excavation of the open pits and construction and operation of the leach pads, waste rock stockpiles, soil stockpiles, diversion channels, haul and access roads, and associated processing and support facilities. The remaining undisturbed acres within the Project mine and process area are principally the throughgoing ephemeral stream channels and isolated areas located between areas of disturbance. Given the intensive nature of the Proposed Action, all cultural resources within the Project mine and process area are expected to experience either direct or indirect impacts without special mitigation. Because few, if any, of the Project mine and process area components can be relocated, avoidance of the identified cultural resources within the Project mine and process area is difficult.

Indirect impacts to identified cultural resources located adjacent to, but outside of, the Project mine and process area boundary may occur if more intense recreational use occurs in these areas as a result of these uses being excluded from the Project mine and process area. However, because the entire Project mine and process area is completely fenced, no direct impacts are expected from operations conducted within the Project mine and process area to identified cultural resource sites located outside of this boundary.

Project facilities constructed or operated within the Project ancillary area are either narrow, linear features (such as the transmission line, water pipeline, and Indian Pass Road realignments), or features of relatively small surface area (such as the water well pad areas, well pump generator area, and substation area). Because there is generally more flexibility regarding the actual siting of each of these Project components, avoidance of the identified NRHP-eligible cultural resources within the Project ancillary area is possible, although not certain. Indirect impacts to identified cultural resources located adjacent to, or on undisturbed lands inside of, the Project ancillary area may also occur, either as the result of increased use of these areas by Project workers and service personnel, or if more intense recreational use occurs in these areas.

~~An intensive Class III pedestrian survey and cultural resources inventory of the area to be disturbed during the realignment of the junction of Indian Pass Road and Ogilby Road has not yet been conducted. Although the area appears to have been heavily disturbed by historic vehicle traffic, such a survey should still be conducted to document the existence or absence of archeological and historical resources in the areas to be disturbed by the new road alignment. The route of the existing 34.5 kV transmission line, which is to be overbuilt with the 92 kV transmission line, has also not been surveyed for the project, although in this case no new surface disturbance would be created over that previously disturbed by the construction and operation of the existing transmission line.~~

Preliminary evaluations of these resources by the field investigators for significance under criteria for eligibility for the NRHP have determined that the prehistoric trail segments and associated features, all of the geoglyphs, all of the ceramic scatters, the chipping stations (when taken together as a whole) and one (1) rock ring site are likely significant resources potentially eligible for the NRHP under

36 CFR 60.4 criterion "D" (resources "that have yielded, or may likely to yield, information important in prehistory or history") (see also Appendix J-1). The cleared circles, other rock ring sites, and possible milling element were judged likely not significant and not eligible for the NRHP. The probable historic use of historic trails in the area was also judged significant and the trail eligible for the NRHP under 36 CFR 60.4 criterion "D" and criterion "A" (resources "that are associated with events that have made a significant contribution to the broad patterns of our history"). The World War II bivouac sites in the region were judged to not be eligible for the NRHP, consistent with previous determinations by the BLM.

Surface disturbance associated with the construction of the new 92 kV transmission line over the existing IID 34.5 kV transmission line is estimated at a maximum of 21 acres. This consists of redisturbance of many of those areas disturbed during original construction of the 34.5 kV transmission line in the mid-1960's (pole access trails and construction areas) and new disturbance associated with the pole access trails, pole construction areas, cable pulling stations, and construction staging areas. Because there is substantial flexibility regarding the location of the facilities which produce the new surface disturbance, and because all of the significant features are located in portions of the cultural sites outside of the actual transmission line corridor, avoidance of the identified NRHP-eligible cultural resources within the transmission line survey area is judged highly likely (see Appendix J-2). However, indirect impacts to these identified significant cultural resources located adjacent to the transmission line corridor may occur if these areas are incidentally disturbed by transmission line construction workers.

The field investigators evaluated the archeological sites for significance and NRHP-eligibility only under 30 CFR 60.4 criterion "D." Historic sites were evaluated for significance and NRHP-eligibility under the additional criteria "A," "B," and "D" under 30 CFR 60.4. Completion of evaluations and determinations for archeological sites, and of the treatment plan for the archeological sites, will require completion of the ongoing consultation between the BLM and the Quechan Tribe (see Section 3.6.2.2). Actual eligibility for the NRHP will be determined by consultation between the California State Historic Preservation Officer (SHPO) and the BLM based on the eligibility criteria.

Impacts to the cultural resources ultimately determined eligible for the NRHP would be considered significant unless a treatment program to recover the scientific information and other NRHP-qualifying values of each resource is successfully implemented before the Project proceeds with the actions which would impact that resource.

4.1.6.3. Mitigation Measures

Incorporated by Project Design:

No specific measures are incorporated by project design.

Incorporated by Regulation:

No specific measures.

Incorporated to Avoid Potentially Significant Effects:

A detailed treatment plan will be prepared and submitted for SHPO approval once NRHP eligibility is determined and Native American consultation is complete.

Principal treatment will be by avoidance, which may be possible for some of the identified resources within the Project mine and process area, and should be quite likely for those resources identified outside of the Project mine and process area. This includes the historic trail which was judged significant under criterion "A." If avoidance is not possible, it may be preferable to "bury" identified resources under Project stockpiles or the heap if possible and determined preferable to the Quechan Tribe.

Specific treatment programs applicable to the identified resources may include:-

- Collection and laboratory analysis of a ten (10) percent random sample of the chipping stations, analysis of 0.1 percent of the surface area using SHPO's "CARIDAP" light density lithic scatter surface observation grids, and collection and curation of a sample of several types of high quality cryptocrystalline lithics;

- Full data recovery of all of the trails which will experience direct impacts, including careful mapping of extent and linkages to other trail segments, degree of imbeddedness in the desert pavements, amount of stone displacement, variability of trail width and depth, and examination of margins for associated artifacts;

- Full data recovery for the geoglyphs which will be directly impacted, including drawing and photographing each geoglyph and determining the non-randomness of stone selection;

- Mapping and collection of each pot drop to establish the ceramic types, date, and attempted reconstruction of shapes.

► 4.1.6-1: ~~An intensive Class III pedestrian survey and cultural resources inventory of the area in which the junction of Indian Pass Road with Ogilby Road will be realigned, including sufficient buffer areas, must be completed and submitted to the BLM. No notice to proceed for the construction of this junction realignment will be issued under the right-of-way to be granted for Indian Pass until consultation under Section 106 of the Historic Preservation Act for this area is completed.~~

~~► 4.1.6-2:~~ A treatment program to recover the scientific information and qualifying values of each identified cultural resource eligible for the NRHP shall be prepared by qualified parties under contract to the Applicant in consultation with the Quechan Tribe and submitted to the BLM for submittal to SHPO for concurrence. Prior to the start of construction of the Project, the accepted treatment program shall be implemented as necessary for the proposed activities.

► 4.1.6-~~3~~-2: ~~To the extent feasible,~~ Project components to be located in the Project ancillary area shall be sited to avoid direct or indirect impacts to identified NRHP-eligible cultural resources. Prior to commencement of construction of any Project components in the Project ancillary area, specific plans showing the areas intended for surface disturbance shall be submitted to the BLM and BLM approval obtained.

► 4.1.6-~~4~~-3: Applicant shall designate a project contact representative (PCR) who will be responsible for overseeing

Project compliance with the conditions and stipulations for cultural resources. The PCR shall have authority to halt all activities that are in violation of the stipulations. The PCR may be a project manager, company environmental coordinator, or other person identified as responsible by the Applicant. Applicant shall provide the name and contact information of the PCR to the BLM prior to site construction. Should previously unidentified cultural resources be discovered during project operations, Applicant shall immediately cease operations in the immediate vicinity of the discovery and notify the BLM. Operations shall not be reinitiated in the vicinity of the discovery until authorized by the BLM.

- 4.1.6-4: To the maximum extent feasible, surface disturbance created during construction of the 92 kV/34.5 kV transmission line shall avoid all direct impacts to all identified potentially NRHP-eligible cultural resources. Fencing and monitoring procedures identified in the cultural resource survey for the transmission line for the prevention of indirect impacts to these resources shall also be implemented, unless otherwise directed by the BLM. A right-of-way for those portions of the 92 kV/34.5 kV transmission line located on public lands shall be obtained from the BLM, and specific plans showing the areas intended for surface disturbance shall be submitted to the BLM and BLM approval obtained prior to commencement of any construction of the 92 kV/34.5 kV transmission line.

No additional mitigation measures are proposed or recommended.

4.1.6.4. Unavoidable Adverse Effects and Level of Significance After Mitigation

Impacts to those cultural resources ultimately determined eligible for the NRHP would be considered significant unless a treatment program to recover the information qualifying each resource for the NRHP is successfully implemented. Treatment options are available to recover the information qualifying each resource for the NRHP, and it is anticipated that such a treatment program will be prepared (in consultation with the Quechan Tribe), accepted by the SHPO, and implemented to mitigate these potential significant impacts to cultural resources to below the level of significance.

4.1.7. Visual Resources

4.1.7.1. Assumptions and Assessment Guidelines

The Proposed Action would normally have a significant effect on the environment if it would:

- Have a substantial, demonstrable negative aesthetic effect.

4.1.7.2. Impacts of the Proposed Action

Impacts to visual resources from the Proposed Action would result from: lighting of mine and process areas enabling mining to occur during nighttime hours; the visibility of surface disturbance associated with the construction and operation of project facilities; the creation and expansion of waste rock stockpiles; the creation and expansion of heap leach facilities; the creation of open pits; the ~~possible~~ construction of a transmission line; and the dust plumes created from blasting in the open pits.

Nighttime lighting would produce "sky glow" which would be visible to some viewers, such as campers and other nighttime dispersed recreation users in the vicinity, including the adjacent wilderness areas ~~and some passersby in the area~~. These activities would be far away from any concentrated recreation area, such as Glamis or Gold Rock Ranch, or traveled route, such that the magnitude of potential visual impact would not be expected to be significant.

The U.S. Marine Corps (USMC) has established a flight corridor (VFR-299) which occupies air space directly above the Project area. The Project area is currently used by the U.S. Marine Corps for military overflights and for nighttime military operations using Night Vision Devices (NVDs). These devices can detect light at levels much lower than those that are detectable by the unaided human eye and, as such, Project lighting could pose significant hazards to pilots during nighttime NVD overflights. Although the Proposed Action represents only a small portion of the available flight corridor, there would be a potential for significant interference with NVD operations.

The ~~leach pad, heap~~, waste rock stockpiles, open pits, ~~possible construction of a~~ transmission line, and access road ~~construction~~ constructed as part of the Proposed Action would represent a substantial

visual contrast for viewers ~~in the proximity~~ of the project. The large "south" waste rock stockpile would be constructed to a maximum height of 400 feet, and the heap 300 feet, above existing grade, and will be one (1) to two (2) hundred feet higher than any existing landform immediately adjacent to the Project mine and process area. The East Pit and Singer Pit will also remain open under the Proposed Action.

Implementation of the Reclamation Plan would reduce some of the impacts associated with the surface disturbance over the long term. Following completion of the operation, all structures constructed within the Project area as part of the Proposed Action (buildings, water wells and pipelines, access roads, transmission line and metering station/switchyard, etc.) would be removed and the disturbed areas ~~the access roads constructed under the Proposed Action would be~~ recontoured as necessary and seeded. The tops of the waste rock stockpiles and the heap would be recontoured, seeded, and would ultimately resemble ~~a~~ stepped mesas. This would minimize the contrast of color and lines that would result from the Proposed Action. However, the ~~The~~ open pits, waste rock stockpiles and heap ~~leach pads~~ would remain as a permanent change to the line and form of the area ~~(see Figure 4-2, Figure 4-4, and Figure 4-6)~~.

Although the Project facilities would be clearly visible from Indian Pass Road and other routes of travel in the immediate vicinity of the Project mine and process area~~. However, according to the visual resource analysis prepared as part of this EIS/EIR (see Appendix K)~~, the ~~proposed project~~ Project facilities would not be easily viewable to most passersby in the surrounding area. There would be a limited view of the Project facilities from a single point, KOP #1, on Ogilby Road, the major access road in the vicinity of the site ~~(see Figure 4-2).~~ The ~~site~~ Project mine and process area would also be viewable from Black Mountain (KOP #2), ~~and~~ from the Picacho Peak Wilderness Area (KOP #3), and from other selected elevated areas in the adjacent mountains ~~(see Figure 4-4 and Figure 4-6)~~, though potential viewers from each of these locations are limited in number.

~~Implementation of the Reclamation Plan would reduce some of the impacts associated with the surface disturbance over the long term. Following completion of the operation, the access roads constructed under the Proposed Action would be recontoured and seeded. The waste rock stockpiles would be recontoured, seeded, and would~~

~~ultimately resemble a stepped mesa. This would minimize the contrast of color and lines that would result from the Proposed Action. The open pits, waste rock stockpiles and heap leach pads would remain as a permanent change to the line and form of the area (see Figure 4-2, Figure 4-4, and Figure 4-6).~~

Photosimulations of the major landforms within the Project mine and process area following completion of mining and reclamation activities have been prepared to simulate views from each of the key observation points. Figure 4-2 shows the view of the Project features from KOP #1, on Ogilby Road. From this viewpoint, only the uppermost portions of the southern end of the "south" waste rock stockpile and the heap would be visible, at a distance of approximately 4 miles, over the slightly elevated terrain in the immediate foreground. These Project landforms would be viewed against the darker forms of Black Mountain and Picacho Mountains on the horizon, and would extend up into the sky.

Photosimulations from KOP #2, Black Mountain, and from KOP #3, the hill immediately south of Indian Pass in the Picacho Peak Wilderness Area, are presented in Figure 4-4 and Figure 4-6, respectively. Viewers from these viewpoints would look down on the Project mine and process area from distances of 4.5 miles and 2 miles, respectively. From KOP #2, the viewer has unobstructed views of the waste rock stockpiles and the top of the heap, although the waste rock stockpiles partially hide both the Singer Pit and the East Pit. From KOP #3, all of the principal Project facilities are visible except the East Pit, which is partially hidden by the "north" waste rock stockpile.

The level of impact to visual resources would depend upon the number of viewers of the project, the viewers' observation point, the compatibility of the operations with the BLM's visual management objectives, and the duration of the disturbance. Visual effects of the Proposed Action were analyzed using the standard procedures in Section 8400 of the BLM Manual. The potential number of daily viewers from KOP #1 (Ogilby Road) may number in the mid-hundreds. The potential number of viewers from KOP #2 would be small, only a few per day, and the number of viewers from KOP #3 is likely to be very small, less than a few per month. ~~The form of the reclaimed project would approach the smooth, rounded character of the surrounding landscape, but would continue to have some areas with a conical form.~~ The line of the reclaimed project would approach ~~soft~~

Figure 4-1: Current View of the Project Mine and Process Area from Ogilby Road (KOP #1)

Figure 4-2: Proposed Action and Complete Pit Backfill Alternative - Projected View of the Project Mine and Process Area from Ogilby Road (KOP #1)

Figure 4-3: Current View of the Project Mine and Process Area from Black Mountain (KOP #2)

Figure 4-4: Proposed Action - Projected View of the Project Mine and Process Area from Black Mountain (KOP #2)

Figure 4-5: Current View of the Project Mine and Process Area from a Hilltop Near Indian Pass in Picacho Wilderness (KOP #3)

Figure 4-6: Proposed Action - Projected View of the Project Mine and Process Area from a Hilltop Near Indian Pass in Picacho Wilderness (KOP #3)

~~and~~ undulating, but would remain discontinuous and have some areas with an angular line. The color of the reclaimed site would approach that of the surrounding landscape. ~~These visual impacts are potentially significant.~~

~~Accordingly, operations~~ Landforms constructed under the Proposed Action would have some visual contrast with the surrounding land even after reclamation. The Project area is located in a ~~Class L (Limited Use)~~ Limited Use area of the CDCA, for which ~~Class II~~ visual resource management objectives, which are semi-equivalent to BLM Class II visual objectives, have been prescribed by the BLM. Based upon the BLM visual resource management objectives for Class II areas (i.e., to retain the existing character of the landscape), the Proposed Action would create potentially significant and unmitigatable impacts to visual resources in the area.

4.1.7.3. Mitigation Measures

Incorporated by Project Design:

- 4.1.7-1: High intensity lighting used for mining and processing operations at night shall be directed downward to reduce fugitive light. Lighting shall have reflectors or shields to further minimize fugitive light. Light stanchions shall be no higher than necessary for safe and efficient lighting.

- 4.1.7-2: Following completion of Project mining activities, all buildings, equipment, supplies, and debris shall be removed to improve the visual appearance of the site.

- 4.1.7-3: Dust suppressants shall be utilized, as necessary and in accordance with ICAPCD permit requirements, on haul roads to minimize fugitive airborne dust generation on the site.

- 4.1.7-4: In conformance with the Reclamation Plan approved by the BLM and Imperial County, disturbed areas shall be recontoured and reseeded or revegetated with native or indigenous species complementary to vegetation found in the surrounding area.

Incorporated by Regulation:

No specific measures.

Incorporated to Avoid Potentially Significant Effects:

- 4.1.7-5: Applicant shall establish a working relationship with the U.S. Marine Corps (USMC) to ensure that nighttime lighting of mine and process areas does not interfere with nighttime overflight operations within flight corridor VFR-299. As part of this mitigation measure, Applicant shall provide the USMC Air Station, Yuma, Arizona, with a detailed, to-scale, map of the Project area identifying the significant surface facilities, transmission lines, and locations of potential light sources to enable the USMC to avoid these areas during their nighttime flight activities.

4.1.7.4. Unavoidable Adverse Effects and Level of Significance After Mitigation

The Proposed Action would result in unavoidable physical changes in the natural contour and character of the Project area. These changes would be visibly apparent over the 20-year estimated life of the Project and would diminish, but continue, through the completion of site reclamation and restoration activities. The physical changes to the area would continue indefinitely, and would ~~become insignificant~~ lessen only after an indefinite period as site reclamation efforts and natural processes restore and revegetate the area to match the surrounding landscape.

The Proposed Action would result in a visual contrast with the surrounding area and would change the existing character of the landscape~~ over the life of the Project and for an indefinite period following site reclamation~~. Based upon BLM objectives for Class II visual areas, the mitigated effects of the Project on visual resources would remain significant.

4.1.8. Noise

4.1.8.1. Assumptions and Assessment Guidelines

The Proposed Action would normally have a significant effect on the environment if it would:

- Increase substantially the ambient noise levels for adjoining areas; or
- Conflict with any applicable noise restrictions imposed by regulatory agencies.

4.1.8.2. Impacts of the Proposed Action

The noise generated by the proposed mining operations would be typical of most construction and mining projects and could be intense for short intervals. Ore loading and handling, and other mine processes, can generate noise levels up to 95 dB(A) at 25 feet. Blasting can cause very short-duration noise levels in excess of 100 dBA at 25 feet.

Noise is attenuated by distance, atmospheric conditions, and topography. Sound wave divergence typically results in a six (6) dBA decrease for every doubling of distance from a noise source (Imperial County Planning Department, 1978). This reduction is highly conservative since it does not account for noise attenuating factors such as topography, wind, temperature gradients, atmospheric pressure, and other site-specific factors, such as the upward deflection of noise generated down in the bottom of a pit. Assuming a maximum noise level of 110 dBA generated from blasting activities, then ambient background noise levels (30 to 50 dBA) would be expected to be approached at a distance of approximately five plus (5+) miles from the Project mine and process area from this activity.

The project site is located in a relatively low-use area. There are no permanent noise-sensitive receptors (i.e., residences, schools, hospitals, etc.) found in the immediate Project area. The nearest permanent noise sensitive receptors are located at the Gold Rock Ranch, approximately seven (7) miles southwest of the Project mine and process area. Based upon the projected attenuation of noise with distance, sound pressure levels generated from blasting and other

activities at the Project mine and process area would approach ambient background levels at this receptor. Although noise levels are expected to be within ambient levels in this area, periodic noise levels from blasting and other activities could be audibly distinguished from natural noise sources, particularly during typically quieter nighttime hours. While noise levels could be discernable, the projected noise levels would not be intrusional and noise impacts would be below levels of significance.

Temporary noise receptors such as those associated with dispersed recreational uses in the area would be impacted by on-site noise generating activities. Some of these receptors may avoid the area during the life of the project. The effects of project generated noise on wildlife is discussed in further detail in Section 4.1.5.3.

4.1.8.3. Mitigation Measures

Incorporated by Project Design:

- 4.1.8-1: All heavy equipment, drilling rigs, and other internal combustion engines shall be equipped with mufflers to minimize noise generated during construction, operation and reclamation activities.

Incorporated by Regulation:

- 4.1.8-2: Applicable Occupational Safety and Health Administration (OSHA) worker noise protection requirements, as set forth in 29 CFR 1910.95, *et seq*, and California Occupational Safety and Health Administration (Cal-OSHA) requirements, as set forth in 8 CCR 5095, *et seq*, shall be implemented by the Applicant.

Incorporated to Avoid Potentially Significant Effects:

- 4.1.8-3: Applicant shall limit blasting activities to daytime hours to minimize nighttime noise disturbance.

4.1.8.4. Unavoidable Adverse Effects and Level of Significance After Mitigation

The Proposed Action would result in unavoidable increases in ambient noise levels within a conservatively estimated five-mile radius of the Project mine and process area over the life of the Project. Noise levels would diminish with distance from the Project noise sources, and ambient noise would decrease with time as the pit walls, heap, and waste rock stockpiles provide increasing topographic attenuation of sound levels from noise sources within the Project mine and process area.

Based on the absence of sensitive noise receptors in the vicinity of the Project area, the mitigated effects of noise from the Project would be below the level of significance.

4.1.9. Land Use

4.1.9.1. Assumptions and Assessment Guidelines

This land use impact assessment evaluates the potential effects of the Proposed Action on existing and planned land uses in the vicinity of the Project area. It also evaluates the effects of the Proposed Action on wilderness and recreational resources in the Project area and vicinity. The Proposed Action would normally have a significant effect on the environment if it would:

- Conflict with adopted environmental plans and goals of the community where it is located;
- Disrupt or divide the physical arrangement of an established community;
- Conflict with established recreational, educational, religious or scientific uses of the area;
- Result in nonconformance with the Wilderness Act of 1964 or the BLM Interim Wilderness Management Policy;

- Substantially degrade or reduce the quantity or quality of the area available for existing or future recreational opportunities; or

- Result in the unmitigated loss of a unique recreational resource.

The effects of the Proposed Action would also be significant if the Project was incompatible with existing land uses in the vicinity, or if the effects of the Proposed Action would not be in conformance with the applicable land use plans and policies described in Section 3.9.1.

4.1.9.2. Impacts of the Proposed Action

Compatibility with Existing Land Uses:

The Project area is undeveloped and the area surrounding the Project area is occupied by large expanses of public land administered by the BLM. The area is relatively isolated and remote from concentrated land uses. The area is generally regarded as open space providing desert habitat for wildlife. The principal land uses in the vicinity of the Project area include: dispersed recreation (hunting, camping, rock collecting, etc.); military aircraft overflight training; and commercial mineral exploration. Two (2) wilderness areas (Indian Pass and Picacho Peak) are located approximately one (1) mile north and east of the Project mine and process area~~,~~; an ACEC (Indian Pass) is located approximately three-quarter (3/4) of a mile north of the Project mine and process area; and three (3) operating precious metal mines (American Girl/Oro Cruz, Mesquite, and Picacho Mines) are located within ten (10) miles south, northwest, and east of the Project area. The nearest residence and area of concentrated public activity is the Gold Rock Ranch, located approximately seven (7) miles southwest of the Project mine and process area, and no other residences exist within ten (10) miles of the site.

Periodic blasting from the mining operations could be a potential hazard to low-flying military aircraft using the general area for training exercises. The new transmission lines installed for the Proposed Action could pose a new potential physical hazard to low-flying aircraft. Project lighting could also pose a hazard during nighttime exercises when pilots are training with night vision devices (NVD) which amplify the available light.

The Project would have no impact on the existing mines in the area. Distant noise and a slight increase in traffic would result in a negligible impact on the nearest residential and visitor inhabitants at Gold Rock Ranch.

More expanded discussions of the potential effects of the Project on surrounding area are provided in the respective air, visual, and noise resource sections of this EIS/EIR.

Compatibility with Adopted Land Use Plans and Policies:

The Project would be compatible with the objectives of the Multiple-Use Class L (Limited Use) classification of the public lands in the vicinity as designated by the BLM CDCA Plan and amendments. The development of locatable minerals on mining claims in areas designated by the BLM as Class L is authorized subject to applicable federal regulations (43 CFR 3809) and state and local laws.

Although the Imperial County General Plan is not directly applicable to activities on public lands administered by the BLM, the Proposed Action would be in conformance with the respective goals and objectives set forth in both the Land Use Element and the Conservation and Open Space Element to the General Plan. The County has also zoned the general area in which the Project area is located as S-Open Space. The zoning classification is not directly applicable to activities on public lands, but the open space classification permits multiple uses consistent with the Conservation and Open Space Element and the General Plan.

Wilderness Areas:

Primary access from the west to the wilderness areas north and east of the Project area is via Indian Pass Road. This road would be realigned to the west around the Project mine and process area over the life of the Project, but the road would be kept open and would not restrict travel to the wilderness areas. Subsequent to the completion of mining activities, the road would be returned to its approximate existing route.

The Project area would be visible from some elevated areas within both the Indian Pass and Picacho Wilderness areas (see Section 4.1.7). Very minor increases in airborne particulates in the

wilderness areas may result from PM_{10} emissions from the Project (see Section 4.1.4). Blasting and other noises generated by the proposed mining activities would be audible within portions of the wilderness areas nearest the Project area (see Section 4.1.8.2). None of these effects would exceed the level of significance.

<u>Recreational Resources</u>:

The entire Project mine and process area (approximately 1,612 acres) would be fenced and closed to the public. Mine construction and operations would not prevent camping, hunting or other dispersed recreational pursuits in offsite areas adjacent to the mine, but Project noise and operations would be expected to discourage some recreational activities in the immediate vicinity of the Project mine and process area over the active life of the mine. There are no unique recreational resources within the Project area, and comparable recreational opportunities would still be available in large areas of public land similar to, but outside of, the Project area. There are approximately 4.4 million acres of BLM Class L lands in the CDCA which are generally available for dispersed recreation. While not intended, the proximity of the mine to Indian Pass Road could attract some visitors to the area as sightseers to observe the large mine equipment and active mining operations. The effects of the Project on recreational resources over the life of the Project would be below the level of significance.

Recreational activities in the immediate vicinity outside of the fenced Project mine and process area would also be affected by the Project. The areas in the immediate vicinity of the Project would be affected by emissions of air pollutants (see Section 4.1.4), visibility of the mine (see Section 4.1.7), noise generated by the mine operations (see Section 4.1.8.2), and Project-related traffic (see Section 4.1.11.1.2). Mitigation measures for air emissions, visibility, noise, and traffic, which are presented in the respective sections of the EIS/EIR, would also reduce the effects of the Project on dispersed recreation in offsite areas in the vicinity of the Project mine and process area. Project facilities outside of the Project mine and process area, including the buried water pipeline and the transmission line, would not affect public access to the primitive campsites along the washes adjacent to Indian Pass Road, and Project operations would not encourage or overly restrict recreational traffic travelling on Indian Pass Road to or from the wilderness areas or other potential recreation

areas located north of the Project area. The effects of the Project on dispersed recreation in the offsite vicinity of the Project mine and process area would be below the level of significance.

Following mining operations, surface facilities would be removed and site reclamation activities would be conducted. The foundations of facility structures would be buried in place, the transmission line constructed along Indian Pass Road would be removed, water wells would be abandoned in conformance with agency requirements, and the buried water pipeline would be abandoned in place. The area would be reopened to the public, but a rock rubble barrier would be constructed around the 227-acre East Pit and 34-acre Singer Pit to barricade the area from vehicle access. The rock barriers constructed around the East Pit and Singer Pit would also indefinitely limit long-term public access to the 261-acre pit areas for many dispersed recreational activities.

As discussed in Section 4.1.5, following site reclamation both vegetation and wildlife habitat values would eventually return to the Project area and, except for limited access to the 261-acre pit areas, opportunities for hunting, hiking, camping and other dispersed recreational activities would again be available in the Project mine and process area. Given the availability of large nearby areas with similar opportunities for dispersed recreation, the mitigated effects of the Project on post-Project recreation resources would be below the level of significance. While the mitigated effects of the Project on recreational resources would be below the level of significance, mitigation measures which would further reduce the effects of the Project on recreational resources are provided in Section 4.1.9.3.

4.1.9.3. Mitigation Measures

Incorporated by Project Design:

- 4.1.9-1: Applicant shall incorporate project design measures to reduce the effects of the Project on air, biological, visual, and noise resources. These measures are described in Sections 4.1.4.3, 4.1.5.4, 4.1.7.3, and 4.1.8.3, respectively.

- 4.1.9-2: At the conclusion of mining activities, Applicant shall recontour all disturbed areas except the pit slopes and the waste rock stockpiles as appropriate to create undulating land forms

that are stable, safe, do not allow for extensive pooling or ponding, and blend with the surrounding undisturbed topography. ~~slopes on waste rock stockpiles, ore heap, and pit walls to stable and safe surfaces and drainage conditions.~~ Applicant shall also construct a loose rock rubble barricade comprised of large boulders or other suitable material~~, or provide an alternative method acceptable to the BLM~~ to prevent vehicle access and restrict public entry into the ~~East Pit~~ ~~open~~ pit area(s).

Incorporated by Regulation:

- 4.1.9-3: Applicant shall conduct mining operations in conformance with the Class L BLM multiple land use ~~objectives~~ guidelines outlined in the CDCA Plan for mining in the area. The Applicant shall also comply with the federal land use requirements prescribed in 43 CFR 3809.

Incorporated to Avoid Potentially Significant Effects:

- 4.1.9-4: Applicant shall keep the USMC air station in Yuma, Arizona apprised of the current schedule for blasting at the mine site to minimize the potential for low-flying military aircraft to be in the vicinity of the Project during blasting activities.

- 4.1.9-5: To facilitate return of the Project area to as near as practical pre-Project condition, Applicant shall, at the end of the active life of the Project, remove the foundations of all facility structures and dispose of the debris at ~~either~~ an offsite waste disposal facility authorized to accept the waste ~~or an onsite, buried disposal site authorized by both the BLM and the CRWQCB~~.

4.1.9.4. Unavoidable Adverse Effects and Level of Significance After Mitigations

The Proposed Action would result in an unavoidable change to the existing land use in the Project area from open space to mining over the 20-year life of the Project. Following completion of mining activities and site reclamation activities, the majority of the Project area would be returned to its availability as open space. However, a loose

rock rubble barricade constructed around the East Pit and Singer Pit areas would indefinitely restrict public access to the 261-acre pit areas.

The mitigated effects of the Project on land use and associated resources would be below the level of significance.

4.1.10. Socioeconomics

4.1.10.1. Assumptions and Assessment Guidelines

The Proposed Action would normally have a significant effect on the environment if it would:

- Induce substantial growth or concentration of population;
- Displace a large number of people;
- Cause a substantial reduction in employment;
- Substantially reduce wage and salary earnings; or
- Cause a substantial net increase in County expenditures.

4.1.10.2. Impacts of the Proposed Action

A net beneficial socioeconomic impact from the construction and operation phases of the Proposed Action would occur over the 20-year lifespan of the Project and the subsequent site reclamation period.

The Project is expected to generate an estimated 100 full-time jobs. During the construction period, approximately 50 to 100 construction jobs would be generated at various times.

Indirect employment opportunities generated by the Project were estimated by applying multipliers commonly used in the mining industry. Dobra (1988) assumes that for every job created in the mining industry, an additional 1.25 job opportunities are created in other sectors of the economy. Therefore, the Project is estimated to create 125 new or continuing job opportunities. The majority of these jobs would be available to residents of Imperial County, California and Yuma County, Arizona.

It is the intent of the Applicant to gradually transfer the experienced employees from the Picacho Mine to the Project as the Picacho operations decline and the Project becomes fully operational. A total of approximately 55 employees would be transferred from the Picacho Mine to the Project. Project annual payroll, including benefits, is estimated to be $5.93 million for 100 employees.

There would be slight increase in demand for housing and community services in the Imperial County, California and Yuma County, Arizona areas over the life of the Project.

The following estimates of Project expenditures and estimated tax revenues from the Project were provided by Chemgold (McArthur, 1995; Steve Baumann, 1996).

- Approximately $48 million in capital would be expended for the Project during 1997. Sales tax on these capital expenditures would amount to approximately $3.72 million. For each year thereafter, average annual capital expenditures would amount to approximately $1.7 million, generating approximately $0.13 million per year in sales tax for capital expenditures only.

- Annual estimated non-capital expenditures are estimated to total $26 million (including payroll).

- Geographic distribution of annual non-capital expenditures have been estimated using data derived from the Picacho Mine operations. It is estimated that 37.1 percent ($9.65 million) of non-capital expenditures would be made in California and 38.1 percent ($9.9 million) would be made in Arizona, for an estimated total of 75.2 percent ($19.55 million) in local non-capital expenditures. The remaining 24.8 percent ($6.45 million) of non-capital expenditures would be made in areas outside of California and Arizona.

- Property taxes in Imperial County are assessed at approximately 1.1 percent per year of the total assessed value. Depending on the assessed valuation of the Project property, projected property taxes are estimated to range between $250,000 and $600,000 per year.

4.1.10.3. Mitigation Measures

No mitigation measures are proposed or recommended.

4.1.10.4. Unavoidable Adverse Effects and Level of Significance After Mitigation

There would be no unavoidable adverse socioeconomic effects from the Proposed Action. Beneficial socioeconomic effects would result from the Project in the form of employment opportunities, tax revenues and increased spending in the local area for goods and services by Project employees and contractors. The socioeconomic effects of the Project would be below the level of significance.

4.1.11. Roads~~, Utilities~~ and Public Services

4.1.11.1. Road and Transportation System

4.1.11.1.1. Assumptions and Assessment Guidelines

The Proposed Action would normally have a significant effect on the environment if it would:

- Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system; or
- Prevent or substantially reduce public access through the elimination of existing routes of travel.

4.1.11.1.2. Impacts of the Proposed Action

The Proposed Action would require the realignment of an approximate 6,000-foot section of Indian Pass Road around the western perimeter of the Project mine and process area to allow for excavation of the West Pit in the current road location. This realignment would also allow for the diversion of an existing drainage channel around the proposed West Pit and the waste rock and soil stockpiles in the northwest portion of the Project mine and process area. The relocated road would cross the adjacent wash "at-grade" at two (2) locations; one (1) upstream and one (1) downstream of the Project mine and process area.

Chemgold has committed to maintaining Indian Pass Road open to the public during construction of the relocated portion of the road; posting signs at the two (2) wash crossings along the relocated portion of Indian Pass Road warning drivers not to cross the wash when flooded, and undertaking emergency repairs or maintenance if Indian Pass Road is damaged by flooding where it crosses these washes. Chemgold has also committed to returning the realigned section of Indian Pass Road back to its approximate original alignment following completion of backfilling of the West Pit. The resulting impacts to Indian Pass Road from the road relocation would be below the level of significance.

The Proposed Action would also result in the realignment of the intersection of Indian Pass Road and Ogilby Road to change the acute angle of the intersection to a right angle. The section of Indian Pass Road which would be replaced would be reclaimed by Chemgold. The net effects of changing the road intersection would be beneficial to the road system, and any adverse effects resulting from changing the intersection would be below the level of significance.

The Proposed Action would result in ~~approximately~~ an estimated 47 lightweight vehicle round-trips to the Project area daily, and ~~approximately~~ an estimated three and one-half (3½) heavyweight vehicle round-trips per day. This estimate assumes that a substantial percentage of approximately 150 workers carpool to the site, which is consistent with the experience with other mines in the area. Traffic volume could be higher if fewer workers carpoolled, and will likely be somewhat higher during the approximate six (6) month construction period ~~would likely be somewhat higher~~ as a result of the additional workers and truck traffic. Although no traffic counts are available for either Ogilby Road in the vicinity of the Project, or for Indian Pass Road, traffic volume is believed very light on both roads. Project employees would work staggered shifts and different work periods. This would result in dispersed traffic flow to and from the Project area throughout the day. Chemgold has committed to realigning the intersection of Ogilby Road and Indian Pass Road to a right angle, and there appears no need for construction of either a right- or left-hand turn pocket on Ogilby

Road. The effects of traffic associated with the Proposed Action would be below the level of significance.

Neither Hyduke Road nor the BLM open routes of travel were constructed for heavy vehicle use, and moderate to extensive upgrade of these roads would be required to permit heavy vehicle traffic. Chemgold has committed that none of these roads in the vicinity of the Project mine and process area would be used for heavy truck or equipment traffic. Fencing of the Project mine and process area and construction of the Project facilities would close several BLM open routes of travel located within the Project mine and process area. However, public vehicular access to all areas around the Project mine and process area is still available to the public on all sides of the Project mine and process area from BLM routes of travel, Indian Pass Road, and Hyduke Road, which would remain open (see Figure 2-6). Thus, the level of impacts to roads, and the impacts to public access in the vicinity of the Project, would be below the level of significance.

4.1.11.1.3. Mitigation Measures

Incorporated by Project Design:

- 4.1.11.1-1: Applicant shall realign ~~and maintain~~ an approximate 6,000-foot section of Indian Pass Road around the Project mine and process area prior to surface disturbance which would impede through traffic on the road, and shall maintain~~ed~~ Indian Pass Road open to the public during construction of the relocated portion. Applicant shall maintain Indian Pass Road from the intersection with Ogilby Road to a point beyond the Project mine and process area during the active life of the Project in consultation with the Imperial County Public Works Department.

- 4.1.11.1-2: Applicant shall not route heavy traffic over Hyduke Road during the transfer of equipment from the Picacho Mine site to the Project area.

- 4.1.11.1-3: Following completion of backfilling of the West Pit, Applicant shall return that section of Indian

Pass Road realigned prior to mine construction back to its approximate original alignment and implement site reclamation activities on the realigned segment.

- 4.1.11.1-4: Applicant shall post warning signs at the two (2) wash crossings along the relocated portion of Indian Pass Road warning drivers not to cross the wash when flooded, and shall undertake ~~emergency~~ repairs or maintenance, as may be necessary and authorized by Imperial County, if Indian Pass Road is damaged by flooding where it crosses these washes.

- 4.1.11.1-5: Applicant shall apply water and/or a chemical dust inhibitor acceptable to Imperial County and the BLM to Indian Pass Road from its intersection with Ogilby Road to the boundary of the Project mine and process area.

- 4.1.11.1-6: Applicant shall acquire the necessary approvals of the BLM and Imperial County to construct the relocated section of Indian Pass Road and the realigned intersection of Indian Pass Road and Ogilby Road, and shall design, construct and maintain these facilities in accordance with the conditions of these permits.

<u>Incorporated by Regulation</u>:

No specific measures.

<u>Incorporated to Avoid Potentially Significant Effects</u>:

- 4.1.11.1-~~6~~7: Applicant shall encourage employees to carpool to the Project area.

4.1.11.1.4. Unavoidable Adverse Effects and Level of Significance After Mitigation

The Proposed Action would unavoidably increase traffic on public roads in the vicinity of the Project area over the 20-year life of the Project.

The mitigated effects of the Proposed Action on traffic and the local transportation system in the vicinity of the Project area would not exceed levels of significance.

4.1.11.2. Utilities

4.1.11.2.1. Assumptions and Assessment Guidelines

The Proposed Action would normally have a significant effect on the environment if it would:

- Encourage activities requiring large amounts of fuel, water, or energy;
- Use fuel, water, or energy in a wasteful manner;
- Breach published national, state, or local standards relating to solid waste or litter control; or
- Extend a sewer trunk line with capacity to serve new development.

4.1.11.2.2. Impacts of the Proposed Action

Extending utility electrical service to the Project area would result in construction of: overbuilding approximately sixteen (16) miles of existing IID 34.5 kV transmission line with 92 kV transmission line in the corridor from Interstate 8 to the line's intersection with Indian Pass Road; and construction of approximately 4.5 miles of new 92 kV transmission line, with a probable underbuilt 7.2 kV line, extending from the intersection of the IID's existing 34.5 kV transmission line to a 92 kV/7.2 kV step-down substation in the Project area. Existing access roads would be utilized to upgrade/install the transmission lines. The overbuilt 92 kV transmission line would be built in the existing 20-foot-wide± IID right-of-way (ROW)~~,~~ ~~and no new surface disturbance over that area disturbed during the construction of the original line is anticipated~~. During periods of utility service interruption, an on-site, ≥500 kW, diesel-powered generator would be used to provide emergency power for essential loads and services.

No telephone utility services are directly available to the Project area. A telephone communications relay to existing Black Mountain communication facilities would be installed to provide telephone service to the offices and maintenance shop via a microwave system which would be located within the Project area. Field communications would be provided by an FM mine communication system. Some concern has been expressed by the USMC that the use of the microwave system and/or the FM mine communication system could potentially interfere with pilot communications during military overflights of the Project area and vicinity.

No utility-provided natural gas service is available to the Project area.

No utility-provided water services are available to the Project area. Water for mine operations and fire protection requirements would be produced from ground water wells constructed southwest of the Project area and piped in a buried pipeline to the Project area. The produced water would be stored in an on-site water storage tank for mining and fire protection requirements. Water collected in the open pits would be used where possible for roadway dust suppression purposes.

Project employees and contractors, and their respective families, relocating to the local area would increase the demand for utility services. However, the Proposed Action is not expected to generate significant population growth or demand for utility services.

4.1.11.2.3. Mitigation Measures

Incorporated by Project Design:

- 4.1.11.2-1: Applicant shall make available an on-site, diesel-fuel generator to meet emergency power needs for essential loads and services during periods of utility-provided electrical service interruption.

Incorporated by Regulation:

No specific measures.

Incorporated to Avoid Potentially Significant Effects:

- 4.1.11.2-2~~3~~: Applicant shall work with the USMC to ensure that neither the microwave communication system nor the FM Project communication system interfere with military overflight communications.

- 4.1.11.2-3~~4~~: Applicant shall acquire the necessary approvals of the BLM, Imperial Irrigation District, and other appropriate agencies to construct the 92 kV transmission line over the existing 34.5 kV transmission line, and shall design, construct and maintain this transmission line in accordance with the conditions of these permits, including avoiding the disturbance of any new surface areas during construction.

4.1.11.2.4. Unavoidable Adverse Effects and Level of Significance After Mitigation

The Proposed Action may result in the consumption of utility-provided electrical power. No other public utility services would be utilized by the Project. The effects of the Proposed Action on utility services would not exceed the level of significance.

4.1.11.3. Public Services

4.1.11.3.1. Assumptions and Assessment Guidelines

The Proposed Action would normally have a significant effect on the environment if it would:

- Create a substantial demand for public services.

4.1.11.3.2. Impacts of the Proposed Action

No public or community services are available in the Project area. Septic treatment systems with leach drain fields would be constructed near the office and shop facilities, near the processing and laboratory facilities, and near the lime storage facilities. Produced ground water stored on the site would be used for commodes and hand-washing. Bottled water would be provided for drinking water.

The Project mine and process area is located on the township line between T.13S., R.21E. and T.14S., R.21E., and between eight (8) and nine (9) GLO/BLM Cadastral Survey monuments are likely located within the Project mine and process area along the township line. (None of the sections adjoining the township line within the Project mine and process area are surveyed or monumented.) Although some of these township line monuments may be able to be protected and maintained, damage or destruction to others within the Project mine and process boundary is inevitable since several are located within the current projected pit or waste rock stockpile boundaries. Any monuments which may be subject to damage or destruction should be perpetuated by the installation and survey of witness monuments, subject to the prior approval of the survey by the BLM Cadastral Survey.

Project employees and contractors, and their respective families, relocating to local communities would increase the demand for public and community services. Most families would be expected to reside in either Imperial County, California or Yuma County, Arizona. However, the Proposed Action is not expected to result in a significant increase in population nor generate significant new demand for public or community services.

4.1.11.3.3. Mitigation Measures

Incorporated by Project Design:

- 4.1.11.3-1: Applicant shall provide an on-site septic system for wastewater treatment, which shall be removed upon completion of Project activities.

- 4.1.11.3-2: When no longer required for Project operations, Applicant shall remove that portion of the 92/~~7.5~~ 7.2 kV transmission line owned by the Project and the electric metering station.

Incorporated by Regulation:

- 4.1.11.3-3: Applicant shall obtain necessary permit(s) for on-site sanitary facilities from the Imperial County Department of Health Services.

- 4.1.11.3-4: To the extent feasible, all GLO/BLM Cadastral Survey monuments shall be avoided and protected from any accidental damage or destruction. All monuments which may be subject to either intentional or accidental damage or destruction within the Project mine and process area shall be perpetuated by the installation and survey of witness monuments, subject to the prior approval of the survey by the BLM Cadastral Survey and conformance with the applicable California codes.

Incorporated to Avoid Potentially Significant Effects:

No specific measures.

4.1.11.3.4. Unavoidable Adverse Effects and Level of Significance After Mitigation

The Proposed Action would result in a slight increase in demand for public services. The effects of the Proposed Action on public services would be below the level of significance.

4.1.12. Emergency Services and Public Safety

4.1.12.1. Assumptions and Assessment Guidelines

The Proposed Action would normally have a significant effect on the environment if it would:

- Create a potential health hazard or involve the use, production, or disposal of materials which pose a hazard to people or animal or plant populations in the area affected;

- Interfere with emergency response plans or emergency evacuation plans.

4.1.12.2. Impacts of the Proposed Action

Design elements of the Project design would minimize the need for offsite emergency services. The Proposed Action would not require routine patrol services by the police as on-site personnel would patrol the Project area 24-hours per day providing security. The Project mine and process area and solution ponds would be completely fenced to prevent unlawful site access. "No trespassing" signs and other warnings would be strategically located along perimeter locations of the property. If needed, police services would be provided by the Imperial County Sheriff's department. The nearest sheriff's substation is located in Winterhaven, approximately 28 road miles from the Project mine and process area.

The Project facilities would be equipped with on-site fire protection systems. Fire services would also be available from the Imperial County Fire Department station at Winterhaven.

Mine chemicals/blasting agents and associated explosives would be stored in locked magazines in compliance with U.S. Bureau of Alcohol and Firearms (BATF), and Mine Safety and Health Administration (MSHA) safety standards.

Relatively large volumes of hazardous, and potentially hazardous, chemicals would be transported to, and stored within, the Project area, including: blasting agents and explosives; solid and liquid sodium cyanide; sodium hydroxide; hydrochloric acid; polymaleic acid; ammonium nitrate; diesel fuel; unleaded gasoline; and motor oil. The transport, storage, and handling of these materials would represent a continuing potential for adverse effects from spills into the environment and safety of the public and Project employees. However, the potential adverse effects of the Project resulting from the transportation, storage, and handling of hazardous materials is below the level of significance.

Some of the chemicals and hazardous materials to be stored in the Project area are incompatible and reactive substances. In particular, a spill or mixing of sodium cyanide with an acid would result in the release of toxic hydrogen cyanide gas. The Project design indicates that cyanide chemicals and acids would never be stored near each other, and the Project would implement triple-redundant procedures to ensure an event would not happen (Personal Communication - Steve Baumann, Chemgold). Further, the use of these chemicals is a standard practice and recognized potential hazard at heap leach precious metal mines, and a potential hazard which employee training and good handling practices would be expected to prevent. -It is extremely unlikely that the use of these chemicals within the Project mine and process area would pose any risk to individuals offsite. The mitigated potential for the Project to create a hydrogen cyanide gas health hazard would be below the level of significance.

There would be a potential for public safety related impacts due to the transport of hazardous chemicals to the Project area via public highways and access roads. The probability of hazardous chemical spillage occurring due to a transport accident is considered low, but the potential for occurrence cannot be entirely eliminated. A hazardous material spill contingency plan would be prepared by the Applicant to respond to potential hazardous material and chemical spills within the Project area. The potential risk of a public safety hazard resulting from spills of hazardous chemicals being transported to the Project area would be below the level of significance.

Following completion of mining and site reclamation activities, the East Pit and Singer Pit would remain open, and the steep sidewalls of the open pits would result in a continuing potential public safety risk. However, elements of the Project design include construction of a loose rock rubble barricade around the open pits to prevent vehicle entry and to reduce public access. The effects of the Project on public safety from the remnant open pits would be below the level of significance.

4.1.12.3. Mitigation Measures

Incorporated by Project Design:

- 4.1.12-1: Applicant shall provide appropriate levels of on-site security, fire protection services, and emergency first-aid medical services.

- 4.1.12-2: Applicant shall construct and maintain a fence around the perimeter of the Project mine and process area over the life of the Project.

- 4.1.12-3: Before removal of the perimeter fence at the end of the active life of the Project, Applicant shall construct a loose rock rubble barricade comprised of large boulders or other suitable material~~, or an alternative method acceptable to the BLM,~~ to prevent vehicle access and limit public access to the exposed open pit(s).

- 4.1.12-4: Applicant shall post no trespassing and hazardous chemical signs in English and Spanish strategically located along perimeter locations of the Project mine and process area.

- 4.1.12-5: Applicant shall prepare a hazardous material spill/release contingency plan and provide appropriate training to all Project employees on the proper response to potential chemical releases.

Incorporated by Regulation:

- 4.1.12-6: Applicant shall prepare and maintain a hazardous material business plan in conformance with the requirements of Imperial County.

- 4.1.12-7: Applicant shall conform with all applicable safety regulations required by the Mine Safety and Health Administration (MSHA), Occupational Safety and Health Administration (OSHA), and California Occupational Safety and Health Administration (Cal-OSHA).

Incorporated to Avoid Potentially Significant Effects:

- 4.1.12-8: Applicant shall prepare an emergency response contingency plan which provides for actions to be taken in the event of an injury accident, hazardous materials release, fire, or other emergency situation. The emergency response contingency plan shall include emergency phone numbers and services available for both surface and air transport of injured employees.

4.1.12.4. Unavoidable Adverse Effects and Level of Significance After Mitigation

The Proposed Action would have the unavoidable indirect potential to adversely effect worker and/or public safety through the accidental spill or release of hazardous substances either in transport to the Project area or from activities within the Project area. This mitigated potential effect is considered low to remote, but the potential for the adverse effect cannot be entirely eliminated.

The mitigated effects of the Proposed Action on emergency services and public safety is below the level of significance.

4.1.13. Other Resources

4.1.13.1. Assumptions and Assessment Guidelines

The Proposed Action would normally have a significant effect on the environment if it would:

- Convert prime agricultural land to non-agricultural use or impair the agricultural productivity of prime agricultural land.

4.1.13.2. Impacts of the Proposed Action

The Proposed Action would have no impacts to: prime and unique farmland; floodplains; ACECs; or wild and scenic rivers~~; or areas of traditional Native American religious concern~~.

4.1.13.3. Mitigation Measures

No mitigation measures are required.

4.1.13.4. Unavoidable Adverse Effects and Level of Significance After Mitigation

The Proposed Action would have no unavoidable adverse effects on other resources.

4.2. Reduced Project Alternative

As discussed in Section 2.2.1, under the Reduced Project Alternative, the scale of the Project would be reduced to between the Proposed Action and the No Action Alternative, depending on the actual decrease in scope of the Project. The scope of the smallest potentially economical project was defined for comparison purposes. This Reduced Project Alternative would eliminate the following Proposed Action facilities: (a) East Pit; (b) "east" waste rock stockpile; (c) south soil stockpile; and (d) one of the north stockpiles. The total surface area of disturbance would be reduced from ~~1,400~~ 1,392 acres to approximately ~~861~~ 853 acres, and the Project life would be decreased from approximately twenty (20) years to about ten (10) years. The West Pit would not be backfilled, and the Indian Pass Road realignment would be permanent.

4.2.1. Geology and Mineral Resources

4.2.1.1. Impacts of the Reduced Project Alternative

Except for leaving the precious metal resources in the East Pit area unmined, there would be no substantive difference in the impacts of the Reduced Project Alternative on geology and mineral resources from those identified for the Proposed Action (see Section 4.1.1.2). The effects of the Reduced Action Alternative on geology and mineral resources would be below the levels of significance.

4.2.1.2. Mitigation Measures

Measures to reduce the effects of the Reduced Project Alternative on geology and mineral resources would be the same as those measures identified for the Proposed Action (see Section 4.1.1.3).

With implementation of the identified measures, the mitigated effects of the Reduced Project Alternative on geology and mineral resources would be below the level of significance.

4.2.2. Soil Resources

4.2.2.1. Impacts of the Reduced Project Alternative

The Reduced Project Alternative would decrease the area of surface disturbance from ~~1,400~~ 1,392 acres to ~~861~~ 853 acres, or an approximate 38 percent reduction in surface area disturbed compared to the Proposed Action. This would translate to an approximate 38 percent reduction in the effects of the Project on soil resources (see Section 4.1.2.2). Other potential impacts, such as erosion, would be the same as those identified for the Proposed Action in Section 4.1.2.2. The effects of the Reduced Action Alternative on soil resources would be below the levels of significance.

4.2.2.2. Mitigation Measures

Measures to reduce the effects of the Reduced Project Alternative on soil resources would be the same as those measures identified for the Proposed Action (see Section 4.1.2.3). With implementation of the identified measures, the mitigated effects of the Reduced Project Alternative on soil resources would be below the level of significance.

4.2.3. Hydrologic Resources

4.2.3.1. Impacts of the Reduced Project Alternative

The Reduced Project Alternative would eliminate surface facilities from the northeast portion of the Project area and would not impact the existing surface drainage channels in that area. The East Pit would not be mined and the potential for ~~a pit lake~~ seeps in the East Pit would be eliminated; however, the ~~elimination of the East Pit would prevent the backfilling of the~~ West Pit would not be backfilled under the Reduced Project Alternative. While the Singer Pit would not be mined below the ground water elevation, the West Pit is projected to be mined to a depth below the existing ground water level, and ground water is expected to be encountered in the West Pit during mining operations. ~~However, calculations~~ Calcualtions comparing pit inflow

and pit outflow rates indicated that the formation of a pit lake is unlikely, and Chemgold has committed to backfilling the West Pit to an elevation that is above the predicted level of any pit lake should a study reasonably determine that a pit lake may form.

The Reduced Project Alternative would have an estimated life expectancy of ten (10) years and a proportional decrease in ground water production would result from the shortened Project, but the rate of drawdown over the Reduced Project Alternative life would be comparable to the Proposed Action. The potential for surface water and ground water impacts would otherwise be approximately equivalent to those described for the Proposed Action (see Section 4.1.3.1.2 and Section 4.1.3.2.2).

4.2.3.2. Mitigation Measures

Measures to reduce the effects of the Reduced Project Alternative on surface water and ground water resources would be the same as those measures identified for the Proposed Action (see Section 4.1.3.1.3 and Section 4.1.3.2.3). With implementation of the identified measures, the mitigated effects of the Reduced Project Alternative on surface water and ground water resources would be below the level of significance.

4.2.4. Air Resources

4.2.4.1. Impacts of the Reduced Project Alternative

The air resource impacts of the Reduced Project Alternative would be approximately the same as the air resource impacts generated by the Proposed Action, except that they would be of a shorter duration (see Section 4.1.4.2).

4.2.4.2. Mitigation Measures

Measures to reduce the effects of the Reduced Project Alternative on air resources would be the same as those measures identified for the Proposed Action (see Section 4.1.4.3). The mitigated impacts of the Reduced Action Alternative on air resources would be below the levels of significance.

4.2.5. Biological Resources

4.2.5.1. Impacts of the Reduced Project Alternative

The Reduced Project Alternative would diminish the loss of shrub/scrub vegetation from ~~1,300~~ 1,292 acres to approximately ~~810~~ 802 acres, and the loss of shrub/tree vegetation from 100 to approximately 51 acres, as a result of mine construction compared to the Proposed Action. Similarly, the decreased surface area of the Reduced Project Alternative would reduce the wildlife habitat losses of desert succulent scrub habitat to approximately ~~810~~ 802 acres and microphyll woodland habitat to approximately 51 acres.

The East Pit would not be mined, but the 124-acre West Pit would be mined and not backfilled, except as may be necessary to backfill the pit to a level which would be necessary to preclude the formation of any pit lake (see Section 2.2.1). The Reduced Project Alternative project life would be approximately 10 years, or about 10 years shorter than the Proposed Action. Similar to the Proposed Action, a loose rock barrier would be constructed around the West Pit to restrict terrestrial wildlife access. Temporary diversions of throughgoing washes around the pit would become permanent and would be restored during site reclamation to approximately the same area of microphyll woodland habitat as existed before the Reduced Project. Site reclamation activities would restore approximately ~~737~~ 729 acres of surface within the Reduced Project Alternative mine and process area to habitat available to deer and other terrestrial species, but the 124 acres comprising the West Pit would not be accessible by many of these species. Approximately 30 net acres of existing microphyll woodland habitat within internal drainages located within the area of the West Pit, leach pad and waste rock stockpile could not be restored to microphyll woodland habitat.

The effects of the Reduced Project Alternative on vegetation and wildlife resources would otherwise be approximately equivalent to those described for the Proposed Action (see Section 4.1.5.2 and Section 4.1.5.3).

4.2.5.2. Mitigation Measures

Measures to reduce the effects of the Reduced Project Alternative on biological resources would be the same as those measures identified for the Proposed Action (see Section 4.1.5.4). With implementation of the identified measures, the mitigated effects of the Reduced Project Alternative on biological resources would be below the level of significance.

4.2.6. Cultural and Paleontological Resources

4.2.6.1. Impacts of the Reduced Project Alternative

The Reduced Project Alternative would create approximately 38 percent less surface disturbance than the Proposed Action within the Project area, and identical surface disturbance within the 92 kV/34.5 kV transmission line area. However, the density of cultural resources identified within the area of the Project mine and process area which would not be disturbed under the Reduced Project Alternative is substantially lower than in the portion to be disturbed, and few of the identified sites within this undisturbed area have been judged potentially eligible for the NRHP. Therefore, the impacts of the Reduced Project Alternative on cultural resources appear to be only slightly less than the impacts to cultural resources which would result from the implementation of the Proposed Action.

4.2.6.2. Mitigation Measures

Measures to reduce the effects of the Reduced Project Alternative on cultural and paleontological resources would be the same as those measures identified for the Proposed Action (see Section 4.1.6.3). However, as with the Proposed Action, until such time as the treatment plan is completed and accepted by the SHPO, it is not possible to determine the actual level of significance of the impacts to cultural resources.

4.2.7. Visual Resources

4.2.7.1. Impacts of the Reduced Project Alternative

The effects of the Reduced Project Alternative on visual resources would be approximately equivalent to those identified for the Proposed Action (see Section 4.1.7.2). The shortened project life would allow site reclamation activities to begin 10 years sooner. The effects of the Reduced Project Alternative on visual resources would not meet the BLM Class II visual objectives for CDCA limited use areas and would be above the level of significance.

4.2.7.2. Mitigation Measures

Measures to reduce the effects of the Reduced Project Alternative on visual resources would be the same as those measures identified for the Proposed Action (see Section 4.1.7.3). However, with implementation of the identified measures, the mitigated effects of the Reduced Project Alternative on visual resources would remain inconsistent with BLM objectives for Class II visual areas, and the mitigated effects of the Reduced Project Alternative on visual resources would remain significant.

4.2.8. Noise

4.2.8.1. Impacts of the Reduced Project Alternative

Noise generated by the Reduced Project Alternative would be approximately the same as noise generated by the Proposed Action, and the effects of the noise generated on potential noise receptors would also be approximately the same as that described for the Proposed Action (see Section 4.1.8.2), except that they would cease sooner. The noise effects of the Reduced Action Alternative would be below the levels of significance.

4.2.8.2. Mitigation Measures

Measures to reduce the noise effects of the Reduced Project Alternative would be the same as those measures identified for the Proposed Action (see Section 4.1.8.3). With implementation of the identified measures, the mitigated effects of the Reduced Project Alternative on noise would be below the level of significance.

4.2.9. Land Use

4.2.9.1. Impacts of the Reduced Project Alternative

Over its active life, the Reduced Project Alternative would have essentially equivalent effects on land use as those described for the Proposed Action (see Section 4.1.9.2). The 10-year, versus 20-year, life of mining operations under the Reduced Project Alternative would allow for site reclamation activities to be implemented approximately ten (10) years sooner than for the Proposed Action. The effects of the Reduced Action Alternative on land use would be below the levels of significance. The Reduced Project Alternative would result in decreased access to the 124-acre West Pit. The loose rock rubble barrier constructed around the pit would limit the availability of the area to some dispersed recreational activities. The remaining ~~737~~ 729 acres of the Reduced Project Alternative mine and process area would be restored during site reclamation and would be accessible to the public.

4.2.9.2. Mitigation Measures

Measures to reduce the effects of the Reduced Project Alternative on land use would be the same as those measures identified for the Proposed Action (see Section 4.1.9.2). With implementation of the identified measures, the mitigated effects of the Reduced Project Alternative on land use would be below the level of significance.

4.2.10. Socioeconomics

4.2.10.1. Impacts of the Reduced Project Alternative

The Reduced Project Alternative would generally have a negative impact on socioeconomic effects when compared to the Proposed Action (see Section 4.1.10.2). Employment opportunities for up to 100 employees would be shortened in duration by approximately 10 years. Similarly, non-capital expenditures of $26 million per year ($260 million over a ten-year shorter operating life) and associated sales taxes would be lost. Initial capital expenditures would not change substantially from those projected for the Proposed Action, but annual capital expenditures of approximately $1.17 million ($11.7 million over the 10-year shorter operating life) and associated sales taxes of

approximately $0.13 million per year ($1.3 million over the shorter operating life) would also be lost.

4.2.10.2. Mitigation Measures

No measures are required to reduce the effects of the Reduced Project Alternative on socioeconomics.

4.2.11. Roads~~, Utilities~~ and Public Services

4.2.11.1. Impacts of the Reduced Project Alternative

The Reduced Project Alternative would have approximately the same effects on roads, utilities, and public services as would the Proposed Action (see Section 4.1.11.1.2, Section 4.1.11.2.2, and Section 4.1.11.3.2). The principal differences would be the shortened project life (10 years compared to 20 years), and the inability to backfill the West Pit with mined backfill because the East Pit would not be mined. Because the West Pit would not be backfilled, the road would not returned to its original alignment at the end of mining operations as indicated in the Proposed Action. The effects of the Reduced Project Alternative on roads, utilities, and public services would all be below the levels of significance.

4.2.11.2. Mitigation Measures

Measures to reduce the effects of the Reduced Project Alternative on roads, utilities, and public services would be the same as those measures identified for the Proposed Action (see Section 4.1.11.1.3, Section 4.1.11.2.3, and Section 4.1.11.3.3). With implementation of the identified measures, the mitigated effects of the Reduced Project Alternative on roads, utilities and public services would be below the level of significance.

4.2.12. Emergency Services and Public Safety

4.2.12.1. Impacts of the Reduced Project Alternative

Over its active life, the Reduced Project Alternative it would have approximately the same effects on emergency services and public safety as would the Proposed Action (see Section 4.1.12.2). The Reduced Project Alternative would leave the West Pit unbackfilled,

with approximately equivalent potential public safety hazards as would exist from the unbackfilled East Pit following the Proposed Action. The effects of the Reduced Action Alternative on emergency services and public safety would be ~~potentially~~ less than significant.

4.2.12.2. Mitigation Measures

Measures to reduce the effects of the Reduced Project Alternative on emergency services and public safety would be the same as those measures identified for the Proposed Action (see Section 4.1.12.3). With implementation of the identified measures, the mitigated effects of the Reduced Project Alternative on emergency services and public safety would be below the level of significance.

4.3. Complete Pit Backfill Alternative

The Complete Pit Backfill Alternative would have generally the same effects on all environmental resources over the life of the Project as those described for the Proposed Action (see Section 4.1). However, at the conclusion of mining operations, mined rock from the waste rock stockpiles would be hauled back to the open East Pit to backfill the pit at least to surface grade. Backfilling operations, including loading, hauling, and dumping, would continue for up to an estimated 5.25-year period after the conclusion of mining operations and before many of the site reclamation activities can be initiated.

4.3.1. Geology and Mineral Resources

4.3.1.1. Impacts of the Complete Pit Backfill Alternative

Except for backfilling of the open pits, there would be no substantive difference in the impacts of the Complete Pit Backfill Alternative on geology and mineral resources from those identified for the Proposed Action (see Section 4.1.1.2). However, mineral resources exposed at the bottom of open pits which are not commercially minable under current economic conditions would be unavailable for subsequent mining without potentially cost-prohibitive removal of the backfilled waste rock. The effects of the Complete Pit Backfill Alternative on geology and mineral resources would be still below the levels of significance.

4.3.1.2. Mitigation Measures

Measures to reduce the effects of the Complete Pit Backfill Alternative on geology and mineral resources would be the same as those measures identified for the Proposed Action (see Section 4.1.1.3). With implementation of the identified measures, the mitigated effects of the Complete Pit Backfill Alternative on geology and mineral resources would be below the level of significance.

4.3.2. Soil Resources

4.3.2.1. Impacts of the Complete Pit Backfill Alternative

The Complete Pit Backfill Alternative would result in the same impacts on soil resources as described by the Proposed Action (see Section 4.1.2.2). With the backfilling of waste rock and closure of the open pits, the effects of surface erosion within the Project area would be expected to decrease slightly compared to those effects identified for the Proposed Action. The effects of the Complete Pit Backfill Alternative on soil resources would be below the levels of significance.

4.3.2.2. Mitigation Measures

Measures to reduce the effects of the Complete Pit Backfill Alternative on soil resources would be the same as those measures identified for the Proposed Action (see Section 4.1.2.3). With implementation of the identified measures, the mitigated effects of the Complete Pit Backfill Alternative on soil resources would be below the level of significance.

4.3.3. Hydrologic Resources

4.3.3.1. Impacts of the Complete Pit Backfill Alternative

The effects of the Complete Pit Backfill Alternative on surface and ground water resources would remain generally the same as those effects described for the Proposed Action (see Section 4.1.3.1.2 and Section 4.1.3.2.2). However, the Complete Pit Backfill Alternative would eliminate the potential for ground water accumulation -in the East Pit and the West Pit as described under the Proposed Action. The effects of the Complete Pit Backfill Alternative on surface water and ground water resources would be below the levels of significance.

4.3.3.2. Mitigation Measures

Measures to reduce the effects of the Complete Pit Backfill Alternative on surface water and ground water resources would be the same as those measures identified for the Proposed Action (see Section 4.1.3.1.3, Section 4.1.3.2.2, and Section 4.1.3.2.3). With implementation of the identified measures, the mitigated effects of the Complete Pit Backfill Alternative on surface water and ground water resources would be below the level of significance.

4.3.4. Air Resources

4.3.4.1. Impacts of the Complete Pit Backfill Alternative

The air resource impacts of the Complete Pit Backfill Alternative would be essentially identical to the air resource impacts generated by the Proposed Action, except that some of them (loading, hauling and dumping) would continue for a longer period of time (see Section 4.1.4.2). The impacts of the Complete Pit Backfill Alternative on air resources would be below the levels of significance.

4.3.4.2. Mitigation Measures

Measures to reduce the effects of the Complete Pit Backfill Alternative on air resources would be the same as those measures identified for the Proposed Action (see Section 4.1.4.3). With implementation of the identified measures, the mitigated effects of the Complete Pit Backfill Alternative on air resources would be below the level of significance.

4.3.5. Biological Resources

4.3.5.1. Impacts of the Complete Pit Backfill Alternative

The effects of the Complete Pit Backfill Alternative on biological resources would be essentially the same as those described for the Proposed Action (see Section 4.1.5.2 and Section 4.1.5.3). The Complete Pit Backfill Alternative would extend the on-site occupation and potential impacts to wildlife for up to an additional 5.25 years while backfilling operations are being conducted, but the Complete Backfill Alternative would eliminate the remnant East Pit and make this 261-acre area available to deer and other terrestrial wildlife species.

Following backfilling and site reclamation activities, fences would be removed and, after an indefinite period, the entire Project area would eventually return to desert wildlife habitat as natural revegetation and restoration processes evolve. Approximately 36 acres of microphyll woodland habitat originating from internal drainages within the Complete Backfill Alternative mine and process area would be lost and could not be restored by site reclamation activities.

4.3.5.2. Mitigation Measures

The measures to reduce the effects of the Complete Pit Backfill Alternative on biological resources would be the same as those measures identified for the Proposed Action (see Section 4.1.5.4). With implementation of the identified measures, the mitigated effects of the Complete Pit Backfill Alternative on biological resources would be below the level of significance.

4.3.6. Cultural and Paleontological Resources

4.3.6.1. Impacts of the Complete Pit Backfill Alternative

The Complete Pit Backfill Alternative would result in ~~literally~~ identical impacts on cultural resources to those created by the Proposed Action (see Section 4.1.6.2).

4.3.6.2. Mitigation Measures

Measures to reduce the effects of the Complete Pit Backfill Alternative on cultural and paleontological resources would be the same as those measures identified for the Proposed Action (see Section 4.1.6.3). However, as with the Proposed Action, until such time as the treatment plan is completed and accepted by the SHPO, it is not possible to determine the actual level of significance of the impacts to cultural resources.

4.3.7. Visual Resources

4.3.7.1. Impacts of the Complete Pit Backfill Alternative

The effects of the Complete Pit Backfill Alternative on visual resources would be similar ~~approximately equivalent~~ to those identified for the Proposed Action over the active life of the Project (see

Section 4.1.7.2). Human occupation and activities would be visually evident for up to an additional five plus (5+) years while backfilling operations were conducted. However, backfilling operations would reduce the size of the waste rock stockpiles and return more of the landscape to a topographic condition more similar to the pre-Project conditions than the Proposed Action. When viewed from Ogilby Road, the Complete Pit Backfill Alternative would look identical to the Proposed Action, since the leach pad and southwest end of the "south" waste rock stockpile, which are the major features visible from Ogilby Road, would not be changed from the Proposed Action (see Figure 4-2). The view of the Project mine and process area from Black Mountain and from the Picacho Peak Wilderness Area under the Complete Pit Backfill Alternative would be different from the Proposed Action because of the backfilling of the open pits and the substantial reduction of the size and extent of most of the waste rock stockpiles (see Figure 4-7 and Figure 4-8). However, the ~~The~~ effects of the Complete Pit Backfill Alternative on visual resources would still not meet the BLM Class II visual objectives for CDCA limited use areas and would thus be above the level of significance.

4.3.7.2. Mitigation Measures

Measures to reduce the effects of the Complete Pit Backfill Alternative on visual resources would be the same as those measures identified for the Proposed Action (see Section 4.1.7.3). However, with implementation of the identified measures, the mitigated effects of the Complete Pit Backfill Alternative on visual resources would remain inconsistent with BLM objectives for Class II visual areas, and the mitigated effects of the Complete Pit Backfill Alternative on visual resources would remain significant.

4.3.8. Noise

4.3.8.1. Impacts of the Complete Pit Backfill Alternative

Noise generated by the Complete Pit Backfill Alternative would be approximately the same as noise generated by the Proposed Action, and the effects of the noise generated on potential noise receptors would also be approximately the same as that described for the Proposed Action (see Section 4.1.8.2). However, backfilling operations would extend the period during which noise is generated in the Project area by up to approximately 5.25 years. The noise effects

Figure 4-7: Complete Pit Backfill Alternative - Projected View of the Project Mine and Process Area from Black Mountain (KOP #2)

Figure 4-8: Complete Pit Backfill Alternative - Projected View of the Project Mine and Process Area from a Hilltop Near Indian Pass in Picacho Wilderness (KOP #3)

of the Reduced Action Alternative would be below the levels of significance.

4.3.8.2. Mitigation Measures

Measures to reduce the noise effects of the Complete Pit Backfill Alternative would be the same as those measures identified for the Proposed Action (see Section 4.1.8.3). With implementation of the identified measures, the mitigated effects of the Complete Pit Backfill Alternative on noise would be below the level of significance.

4.3.9. Land Use

4.3.9.1. Impacts of the Complete Pit Backfill Alternative

Over the active life of the Project, the Complete Pit Backfill Alternative would have essentially equivalent effects on land use as those described for the Proposed Action (see Section 4.1.9.2). Backfilling operations would extend the period of time during which dispersed recreation and other uses in the vicinity would be excluded from the Project area or be indirectly affected. However, following completion of backfilling, the construction of the loose rock rubble barricade around the East Pit and Singer Pit areas would be unnecessary, and public access to the entire Project area would be possible. The effects of the Complete Pit Backfill Alternative on land use would be below the levels of significance.

4.3.9.2. Mitigation Measures

Measures to reduce the effects of the Complete Pit Backfill Alternative on land use would be the same as those measures identified for the Proposed Action (see Section 4.1.9.2). With implementation of the identified measures, the mitigated effects of the Complete Pit Backfill Alternative on land use would be below the level of significance.

4.3.10. Socioeconomics

4.3.10.1. Impacts of the Complete Pit Backfill Alternative

The Complete Pit Backfill Alternative would have the same positive socioeconomic effects as the Proposed Action over the life of the mining operations (see Section 4.1.10.2). In addition, a somewhat smaller staff of workers would be employed or contracted for the up to 5.25-year period needed to complete the backfilling operations. Additional purchases of fuel, replacement equipment and maintenance, and other goods and services would be required over the life of the backfilling operation. Chemgold estimates that the total additional cost of completely backfilling the East Pit would be approximately $~~136~~ 77 million (assuming approximately $~~0.55~~ 0.46 per ton of material moved).

4.3.10.2. Mitigation Measures

No measures are required to reduce the effects of the Complete Pit Backfill Alternative on socioeconomics.

4.3.11. Roads~~, Utilities~~ and Public Services

4.3.11.1. Impacts of the Complete Pit Backfill Alternative

The Complete Pit Backfill Alternative would have approximately the same effects on roads, utilities, and public services as would the Proposed Action (see Section 4.1.11.1.2, Section 4.1.11.2.2, and Section 4.1.11.3.2). However, the access roads to the Project area would continue to be utilized during the up to 5.25-year period needed to backfill the pits. The effects of the Complete Pit Backfill Alternative on roads, utilities, and public services would be below the levels of significance.

4.3.11.2. Mitigation Measures

Measures to reduce the effects of the Complete Pit Backfill Alternative on roads, utilities, and public services would be the same as those measures identified for the Proposed Action (see Section 4.1.11.1.3, Section 4.1.11.2.3, and Section 4.1.11.3.3). With implementation of the identified measures, the mitigated effects of the

Complete Pit Backfill Alternative on roads, utilities and public services would be below the level of significance.

4.3.12. Emergency Services and Public Safety

4.3.12.1. Impacts of the Complete Pit Backfill Alternative

Over its active life, the Complete Pit Backfill Alternative would have approximately the same effects on emergency services and public safety as would the Proposed Action (see Section 4.1.12.2). The Complete Pit Backfill Alternative would result in the backfilling of all of the pits within the Project area and would, thereby, eliminate the potential public safety hazard associated with the East Pit. The effects of the Complete Pit Backfill Alternative on emergency services and public safety would be below the levels of significance.

4.3.12.2. Mitigation Measures

Except for the unnecessary measures to fence the Project area and restrict access after the completion of backfilling and site reclamation operations, the measures to reduce the effects of the Complete Pit Backfill Alternative on emergency services and public safety would be the same as those measures identified for the Proposed Action (see Section 4.1.12.3). With implementation of the identified measures, the mitigated effects of the Complete Pit Backfill Alternative on emergency services and public safety would be below the level of significance.

4.4. No Action Alternative

Under the No Action Alternative, the Project would not be constructed and precious metals within the Project area not be mined. As discussed in Section 2.2.3, if the No Action Alternative is adopted, the Project area would remain as it currently is, and existing dispersed recreational uses of the area would continue.

4.4.1. Geology and Mineral Resources

No adverse impacts on geology or mineral resources would result from the No Action Alternative. The disapproval of the Project could discourage future proposals for mining of, and/or maintaining claims for, the precious mineral resources within the Project area.

4.4.2. Soil Resources

No adverse impacts on soil resources in the Project area would result from the No Action Alternative.

4.4.3. Hydrologic Resources

No adverse impacts on surface water or ground water resources in the Project area would result from the No Action Alternative.

4.4.4. Air Resources

No adverse impacts on air resources within, or in the vicinity of, the Project area would result from the No Action Alternative.

4.4.5. Biological Resources

No adverse impacts on biological resources within, or in the vicinity of, the Project area would result from the No Action Alternative.

4.4.6. Cultural and Paleontological Resources

No adverse impacts on cultural or paleontological resources within, or in the vicinity of, the Project area would result from the No Action Alternative.

4.4.7. Visual Resources

No adverse impacts on visual resources would result from the No Action Alternative.

4.4.8. Noise

No adverse noise impacts would result from the No Action Alternative.

4.4.9. Land Use

With the probable exception of the discontinuance of mining exploration activities, the existing land use within, and in the vicinity of, the Project area would be unaffected by the No Action Alternative.

4.4.10. Socioeconomics

The No Action Alternative would not create the 100 job opportunities, nor the estimated $5.93 million in annual payroll, from the Project. The No Action Alternative would also result in the loss of the $48 million initial capital expenditures, $1.7 million annual capital expenditures, and the $26 million per year non-capital expenditures and associated taxes and benefits to the local economy projected by the Project.

4.4.11. Roads~~, Utilities~~ and Public Services

No adverse impacts on roads, utilities, or public services within, or in the vicinity of, the Project area would result from the No Action Alternative.

4.4.12. Emergency Services and Public Safety

No adverse impacts on emergency services or public safety provided to, or in the vicinity of, the Project area would result from the No Action Alternative.

5. CUMULATIVE EFFECTS

5.1. Introduction

As required under NEPA and CEQA, this chapter addresses the potential for significant cumulative environmental effects on the environmental resources in the surrounding area which could result from the implementation of the Proposed Action and other reasonably foreseeable future projects in the general vicinity of the Project. Cumulative impacts are defined under federal regulations as:

> "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individual minor but collectively significant actions taken place over a period of time" (40 CFR 1508.7).

The State of California CEQA guidelines define cumulative impacts as:

> "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts. The individual effects may be changes resulting from a single project or a number of separate projects. The cumulative impact from several projects is the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time" (14 CCR 15355).

The geographical area considered for the analysis of cumulative effects may vary in size and shape to reflect each environmental resource which is evaluated. For this cumulative impact analysis, the potentially affected resources are located in a study area which is generally bounded by the Colorado River to the east; the Chocolate Mountains to the northeast; the Algodones Sand Dunes/East Mesa to the west; and the Mexican border to the south (see Figure 5-1).

Environmental consequences of the Proposed Action were evaluated in Chapter 4 for the various environmental resources. Based upon the scoping conducted for the Project, and the analysis of the environmental resources conducted in Chapter 4, only hydrologic resources, air resources, biological (wildlife) resources, cultural resources, and visual resources are considered to have the potential to be

Figure 5-1: Locations of the Projects Considered in the Cumulative Impacts Analysis

cumulatively impacted by existing and proposed developments within the identified cumulative impacts study area (see Section 5.2).

Project-specific impacts to the other resources evaluated in Chapter 4 may also occur as a result of the other reasonably foreseeable projects, but these impacts would not be cumulatively significant. The potentially significant cumulative effects to these identified resources from the reasonably foreseeable future scenario are provided in Section 5.3.

5.2. Existing, Proposed and Reasonably Foreseeable Activities in the Area of Cumulative Analysis

The individual projects described below comprise the existing and reasonably foreseeable future projects identified by Imperial County and the BLM, El Centro Resource Area. These projects and uses include mining uses, commercial uses, water conservation projects, military uses, and recreational uses. All of these projects and uses have the potential to impact the environmental resources of concern within the area of the cumulative impacts analysis. The reasonably foreseeable future analysis for this EIS/EIR was evaluated for a 20-year time frame based on the estimated potential future life of the Project.

5.2.1. Mining Uses

5.2.1.1. American Girl Mine Project

The following description of the American Girl Mine Project was obtained from the Draft EIS/EIR which was prepared on behalf of the U.S. Bureau of Land Management by P.M. DeDycker and Associates (BLM, 1994b).

The American Girl Mine Project consisted of two (2) adjacent operating components, the Padre Madre operation and the American Girl Canyon operation (see Figure 5-1). The American Girl Canyon and Padre Madre operations were scheduled to cease mining operations in 1994, although operations continue into 1996. A third component, the Oro Cruz operation of the American Girl Mine Project, began operations in late 1995 and was projected to ~~was scheduled to begin operations in 1994 and~~ cease mining operations by ~~1997~~ 1999. Reclamation and post-mining closure activities at the American Girl Mine Project were expected to last until mid-~~1999~~ 2001. In addition, construction has commenced on the relining of an existing heap leach pad from which the leached ore has been removed to allow the pad to

be reused for processing of additional ore (Personal Communication - ~~Jessie~~ Jesse Soriano, Imperial County Planning/Building Department, 1996).

The Padre Madre operation involved the annual mining and heap leaching of approximately 200,000 tons of ore, and the annual mining and stockpiling of approximately 400,000 tons of waste rock. Cumulative totals of 3.5 million tons of ore and 12.5 million tons of waste rock were authorized. The American Girl Canyon operation was authorized to extract 8.5 million tons of surface- and underground-mined ore, and excavate and stockpile 17 million tons of waste rock. The cumulative total surface disturbance for both of these operations was estimated to be 618 acres.—

As proposed, mining activities associated with the Oro Cruz operation (pits, waste dumps, haul roads, etc.) would directly disturb an estimated 191 acres. Ore processing and milling would be conducted at the existing American Girl Canyon facility. Surface mining at the Oro Cruz operation would cumulatively produce approximately 2.5 million tons of ore and 8.5 million tons of waste rock at maximum yearly rates of approximately 1.2 million tons of ore and 3.5 million tons of waste rock. During this same time underground mining would produce approximately 65,000 tons of waste rock and 500,000 tons of ore, at a maximum rate of approximately 250,000 tons of ore per year.

Water required for mining, milling and heap leach processing was to be supplied from ground water produced from the American Girl well southwest of American Girl Canyon. The maximum yearly consumptive use for the Oro Cruz operation was not expected to exceed 300 acre-feet.

5.2.1.2. Mesquite Mine

The Mesquite Mine and associated facilities occupy a total of approximately 5,200 acres of land east of Glamis (Environmental Solutions, Inc., 1987) (see Figure 5-1). Approximately 3,100 acres of the total project area are public lands managed by the BLM. Approximately 4,000 acres of the 5,200-acre Project area have been, or would eventually be, disturbed by the mining activities. Disturbed areas would include approximately ten (10) overburden stockpiles, which would be used to dispose of approximately 350 million tons of

waste rock. These overburden piles are projected to reach heights of about 280 feet above the existing ground surface. Other disturbed areas include the four (4) open pits, the approximately 1,000 acres of lined heap leach pads, mine access roads, utility infrastructure, and other ancillary facilities (Environmental Solutions, Inc., 1987).

The Mesquite Mine, which began operating in 1985, is currently operating at approximately 85 percent of its authorized capacity. Mining activities are expected to operate at this level up until 1997. After 1997, mining activities are expected to gradually decline, with operations scheduled to discontinue sometime within the next 9 to 14 years (by the year 2008); market conditions would ultimately determine the actual closure date (Environmental Solutions, Inc., 1987).

The Mesquite Mine would extract a total of approximately 440 million tons of gold-bearing ore and barren rock from four (4) open pits by the anticipated closure within the next 9 to 14 years of active mine life.

Water consumption is expected to be approximately 1,000 afy (BLM, 1995a). Water is supplied by a system consisting of three (3), 2,500-gpm capacity water wells located approximately three (3) miles south of the mine (Environmental Solutions, Inc., 1993a).

5.2.1.3. Picacho Mine

The following description of the Picacho Mine operation was obtained from personal communications with Chemgold, Inc. (~~C.K. McArthur,~~Personal Communication - C.K. McArthur, Chemgold, Inc., 1995).

Chemgold, Inc. operates the Picacho Mine, which is located in easternmost Imperial County, California, approximately eighteen (18) miles north of Yuma, Arizona (see Figure 5-1). The Picacho Mine property consists of 600 acres of fee lands and 1,650 acres of unpatented lode mining claims. The total disturbed area at the Picacho Mine amounts to approximately 330 acres.

Since 1980, open-pit, run-of-mine, heap leach gold mining and processing has occurred at the Picacho Mine. Four (4) open pit deposits have been developed, with current total annual mining

averaging approximately 1.5 million tons of ore and 7.0 million tons of waste. Development of an additional 3.6 million tons of ore reserves is now underway, which is projected to be the final phase of mining at Picacho. The completed pits and heaps are currently undergoing reclamation. Mining is expected to terminate in 1998, with processing and reclamation activities scheduled to continue until 2001.

Water for mining and processing operations is supplied by pipeline to the mine from a shallow well located adjacent to, and which is assumed to produce water recharged from, the Colorado River river aquifer. Water from the Colorado River is used through a present-perfected water right to 115 afy of water held by the property and verified by contract with the U.S. Bureau of Reclamation. The Picacho Mine uses the entire annual 115 afy allocation of water from the Colorado River river aquifer. No local ground water is used at the Picacho Mine due to the lack of a sufficient aquifer in this location.

5.2.1.4. Mineral Exploration

Mineral exploration activities are ongoing to some extent within the boundaries of each of the mines within the cumulative impacts study area. However, these activities would not substantially impact the resources of concern because they have already been accounted for in the impacts resulting from the mine operations themselves.

5.2.2. Commercial Uses

5.2.2.1. Mesquite Regional Landfill

The Mesquite Regional Landfill is a proposed new regional Class III sanitary landfill, to be located in Imperial County adjacent to the existing Mesquite Mine (BLM, 1995a) (see Section 5.2.1.2). The landfill would accommodate up to a total of 600 million tons of municipal solid waste residue and would have a life span of approximately 100 years. The municipal solid waste residue would be transported to the landfill from various Southern California communities via the existing Southern Pacific Transportation Company main line rail track and a short new railroad spur extending from the main line rail track to the landfill site. The landfill would be constructed on land currently managed by the BLM which would be exchanged for other land in the Santa Rosa Mountains Natural Scenic Area and near the Chuckwalla Bench ACEC. The landfill property

covers approximately 4,245 acres, although the actual landfill footprint is expected to occupy approximately 2,290 acres. Approximately 588 acres of the landfill site has been extensively disturbed by previous on-site activities, and vegetation over an area of approximately 3,657 acres would be disturbed.

The proposed landfill anticipates the use of water supplied from the existing Mesquite Mine ground water well field, located approximately one (1) mile south of the landfill site. The three (3) wells each have estimated maximum yields of 2,500 gallons per minute (gpm). The average annual water usage associated with the landfill operations is expected to be less than 1,000 acre-feet per year.

5.2.2.2. Gold Rock Ranch

The following description of the Gold Rock Ranch was provided by the BLM (Personal Communication - A. Schoeck, BLM, 1995). Gold Rock Ranch is ~~an approximately 20 acre,~~ privately-owned area that, until recently, was owned by a single family. Gold Rock Ranch is located approximately seven (7) miles southwest of the Project mine and process area.

Gold Rock Ranch is used as an RV park/campground and can accommodate about 20 campers. Water and electrical hookups are available. A small country store is also located on the site. Primary usage is during the winter months, when an average of 3,000 visitors and campers attend the annual "Rockhound Roundup." This event lasts for between 5 ~~to~~ and 10 days around Thanksgiving.

An on-site well is used to supply domestic water for Gold Rock Ranch. Current average usage is estimated at 5,000 gpd (less than 6 afy), with an estimated historic maximum usage rate of 12,000 gpd (less than 14 afy), as estimated by the owner (BLM, 1994b). Surface disturbance associated with Gold Rock Ranch is estimated at 20 acres.

5.2.2.3. Agricultural Projects

Citrus Heights Ranches received a Conditional Use Permit (CUP) from Imperial County which allows for the reactivation and operation of three (3) water wells on approximately 475 acres of land in Section 8, Township 16, Range 21 East, SBB&M. The site is

located approximately two (2) miles east of the intersection of Ogilby Road and Interstate 8 (Imperial County Planning Commission, 1995).

Citrus Heights plans to pump 1,600 acre-feet of ground water per year in order to grow citrus trees. The existing site is fallow farm land, which was previously used to grow jojoba. Other than the improvements to the three (3) wells, the only other new improvements would be for the installation of irrigation systems (Imperial County Planning Commission, 1995).

5.2.3. Water Conservation Projects

5.2.3.1. Metropolitan Water District All American Canal Lining Project

The following description of the Metropolitan Water District All American Canal Lining Project was obtained from the Final EIS/EIR for this project (U.S, Bureau of Reclamation, 1994).

The Metropolitan Water District (MWD) of Southern California is proposing to line a 29.9-mile section of the existing, unlined All American Canal beginning just south of Pilot Knob and ending at the Imperial Irrigation District's (IID's) Drop 4, where the canal enters the irrigated area of the Imperial Valley in Imperial County, California. The project would begin about six (6) miles west of Yuma, Arizona, and end about sixteen (16) miles east of El Centro and Calexico, California. The purpose of the project is to conserve up to 67,700 acre-feet of the estimated 91,000 acre-feet per year of water currently being lost through seepage from the unlined canal.

Construction of the project would result in the emissions of PM_{10}, although dust from excavation and grading operations would be localized and controlled by sprinkling access roads and exposed areas with water. Implementation of this project would also reduce ground water recharge to the Amos-Ogilby-East Mesa ground water basin by up to an estimated 67,700 acre-feet per year, which would reduce or eliminate the wetland vegetation, and wetland habitat-dependent wildlife, which has developed from this leaking water along the adjacent unlined portion of the canal. However, plans for construction of this canal lining project have been suspended and there is no schedule for implementation (Personal Communication - Michael Walker, U.S. Bureau of Reclamation, 1996).

5.2.3.2. U.S. Bureau of Reclamation East Mesa Recharge Demonstration Recovery Project

The following description of the U.S. Bureau of Reclamation (USBR) East Mesa Recharge Demonstration Recovery Project (East Mesa Recharge Project) was obtained from Final EIS/EIR for the proposed Mesquite Regional Landfill (BLM, 1995a).

The East Mesa Recharge Project involves the development of a recharge/recovery operation in the vicinity of the All American Canal at the Coachella Canal branch to demonstrate the feasibility and economics of recovering water lost from the unlined canal. The proposal involves the installation of four (4), 16-inch diameter pilot demonstration wells, each to be dug within the recharge area to a depth of approximately 70 feet along the west side of the old, unlined Coachella Canal. Water recovered from the wells would be diverted to the lined canal to the east through an 8-inch diameter pipe. The USBR intends on conducting the recovery test by pumping 1,000 acre-feet of water from the East Mesa recharge basin over a one (1)-year period. Approximately an equivalent volume of water would be recharged to the area from the unlined canal, thereby resulting in no net loss of ground water in the East Mesa Basin during the test. If the recharge and recovery process proves successful, the USBR has indicated that the project could be made permanent, but the potential for long-term recharge and recovery pumping is uncertain and beyond the scope of this cumulative impact assessment.

5.2.4. Military Uses

5.2.4.1. Chocolate Mountain Aerial Gunnery Range

The U.S. Marine Corps (USMC) maintains the Chocolate Mountain Aerial Gunnery Range (CMAGR) which, at its closest, is approximately ten (10) miles northwest of the Project area, immediately north of the Mesquite Mine and State Route 78 (SR 78). The CMAGR is actively used by various branches of the U.S. Armed Forces for military aircraft training and testing and for live ordnance delivery practice (BLM, 1995a).

The activities associated with the CMAGR substantially increase ambient noise levels in the area during the activities (BLM, 1995a). The resulting increase in noise levels disrupts and alters sensitive

wildlife species and their migratory patterns for intermittent short-term, and possibly long-term, periods. Low-level military overflights and ordnance explosions also contribute to airborne dust generation and some loss of vegetation and wildlife habitat.

5.2.4.2. Other Military Uses

The USMC conducts both daytime and nighttime helicopter flight training on public lands in and around the Project area and vicinity (~~T. Manfredi,~~ Personal Communication - T. Manfredi, USMC, June 2, 1995). These training exercises are conducted at low-levels, sometimes including touch downs. The nighttime training includes the use of night vision goggles (NVG) and other night vision devices (NVD). This activity can increase ambient noise levels, increase airborne dust generation, and disturb both wildlife and recreational users (campers, etc.).

Two (2) military Visual Flight Rule (VFR), low-level flying routes for fixed wing aircraft are also located in the vicinity of the Project area and cumulative impact study area (~~T. Manfredi,~~ Personal Communication - T. Manfredi, USMC, June 2, 1995). VFR-299 (445th Military Airlift Wing-March Air Force Base) and VFR-1266 (Marine Air Group-13-MCAS Yuma) each consist of six (6)±-mile wide flight corridors which are used by fixed-wing military aircraft during training or travel. Aircraft use of the VFR corridors through the cumulative impacts study area has the potential to also increase ambient noise levels, increase airborne dust generation, and disturb both wildlife and recreational users, although to a lesser extent than the low-level helicopter use.

5.2.5. Recreational Uses

Dispersed recreational activities, including off-road and off-highway vehicle (ORV and OHV) uses, hunting, and camping, are conducted in the cumulative impacts study area. These activities have the continuing potential to adversely impact environmental resources within the described cumulative impacts study area.

ORV/OHV, hunting, and camping activities can impact air quality by increasing airborne dust generation from soils and pollutant emissions. These activities also place increased pressure on wildlife and have the potential for long-term and potentially severe impact on wildlife habitat. Dispersed

recreational activities can also be a significant contributing factor in the destruction of cultural resources.

5.3. Evaluation of Potential Cumulative Impacts and Mitigation

5.3.1. Hydrologic Resources (Ground Water)

The existing ground water in storage in the Amos-Ogilby-East Mesa Basin has been estimated at 229 million acre-feet, and the amount of recharge to the basin has been estimated to be 100,000 afy, predominantly from leakage from the unlined section of the All American Canal (Environmental Solutions; 1993a). The cumulative maximum total of annual ground water consumption from the basin by the relevant identified cumulative projects, including the Proposed Action, totals approximately 5,106 afy. Figure 5-2 presents a graph of the annual gross recharge to the basin, the annual consumption by applicable projects, and the resulting net recharge to the basin, for each year from 1997 through the year 2016. As shown, the annual consumption of ground water by all of these wells together is a small percentage (maximum of approximately five (5) percent) of the gross estimated recharge to the basin. The MWD All American Canal Lining Project, if constructed, would result in an estimated reduction in recharge from the canal of two-thirds (2/3), or 67,700 afy, much of which would be recharged lost to the Amos-Ogilby-East Mesa Basin. However, even with this reduction, the net recharge to the basin from the All American Canal alone even after lining would still far exceed the cumulative ground water consumption from the identified projects and uses. As stated in Section 5.2.3.1, this project is currently on hold and has no schedule for implementation.

The maximum total estimated cumulative annual consumption of ground water by the cumulative projects within the basin also represents approximately 0.002 percent of the ground water currently estimated stored in the basin. Based upon ground water drawdown estimates provided for the Project wells alone (see Section 4.1.3.2.2), and because these cumulative projects are widely scattered and the ground water consumption distributed, there should be no significant interference between the projects from their individual uses of the ground water resources. No mitigation measures are recommended.

5.3.2. Air Resources (Air Quality)

The identified individual cumulative study area projects each emit air pollutants. However, consistent with the rest of Imperial County, fugitive PM_{10} is the air pollutant emitted in the largest quantity. However, fugitive

Figure 5-2: Cumulative Ground Water Consumption and Recharge from the Amos-Ogilby-East Mesa Basin

PM_{10} emissions do not produce substantial ambient air concentrations at great distances from the source, and the project areas are each located at relatively great distances (approximately five to ten (5-10) miles) from the next nearest project or concentrated use area. This, together with the recently adopted County-wide requirement for the implementation of RACM for the reduction of fugitive PM_{10} emissions and the typical project-specific mitigation measures, indicates that the identified projects are not expected to result in a significant cumulative air quality impact.

5.3.3. Biological Resources

Plant and wildlife habitat will be adversely impacted by the cumulative effects of the identified projects. Surface disturbance within the respective project areas will result in a direct loss of the habitat impacted. In addition, the quality of habitat in neighboring areas will be indirectly impacted by project noise, surface disturbance, dust, and other off-site intrusions. Direct impacts are semi-quantifiable in terms of habitat loss, but indirect biological impacts are much more difficult to assess as they vary with site-specific conditions and the sensitivity of the species which occur in the respective habitat types impacted. A distinction can also be made between the cumulative temporary losses of habitat that is removed over the active life of project activities but can be reclaimed after project activities have been completed, and permanent losses of habitat that remain indefinitely at the end of project activities and after the respective project sites are closed. Both direct and indirect, and temporary and permanent, cumulative impacts result from the existing and reasonably foreseeable projects identified.

As discussed in Section 3.5, multiple species of plants and wildlife were observed within the Project area or are known or suspected to occur within the areas of one or more of the multiple projects evaluated by this cumulative impact assessment. Special-interest species (i.e., listed species, USFWS special status species, BLM sensitive species, etc.) which are known or suspected to be "resident" species in one or more of the project areas include: cheeseweed owlfly, flat-tailed horned lizard (suspected to occur only in the Gold Rock Ranch project area due to its proximity to sand sheets extending east from the Algodones Dunes), chuckwalla, desert tortoise, loggerhead shrike, crissal thrasher, black-tailed gnatcatcher, and long-eared owl. A cumulative incremental loss of primary, breeding or nesting habitat for these species results from the projects.

Special-interest species which may make "permanent" use of one or more of the project areas for varied uses (i.e., foraging, roosting or resting)

include: desert bighorn sheep, Yuma puma/mountain lion, American badger, burrowing owl, prairie falcon, barn owl, California leaf-nosed bat, greater western mastiff bat, spotted bat, Townsend's big-eared bat, Yuma myotis, cave myotis, small-footed myotis, occult little brown bat, and desert pallid bat. A cumulative incremental loss of foraging, roosting, resting, or other limited habitat use results from the projects for these species.

Special-interest species which may make "occasional" use of one or more of the project areas as migrant or seasonal foraging or resting areas, primarily in the winter months, include: northern harrier, sharp-shinned hawk, peregrine falcon, golden eagle, ferruginous hawk, Cooper's hawk, gila woodpecker, and Vaux's swift. An incremental loss of seasonal or transient habitat for these species results from the projects.

Many other wildlife species are also known to use one or more of the project areas for resident, permanent, and occasional uses (see Section 3.5.6). Notable among these species is mule deer, which is a permanent resident species, and other game species such as Gambel's quail, mourning dove, and white-winged dove. Other common mammals include: antelope ground squirrel, Merriam kangaroo rat, desert woodrat, black-tailed jackrabbit, kit fox, coyote, and wild burro. A cumulative incremental loss of habitat results for these and other permanent, resident, or migrant species which use one or more of the project areas. Similarly, a cumulative incremental loss of habitat results for both sensitive plant species and common plants which occur in the areas disturbed by one or more of the identified projects.

The cumulative surface disturbance from the identified mine projects would total approximately ~~6,539~~ 6,552 acres. The approximate areas of surface disturbance from the other identified projects and non-dispersed activity areas include the Mesquite Regional Landfill (3,657 acres), Gold Rock Ranch (20 acres), and Citrus Heights (475 acres). Thus, the combined concentrated areas of surface disturbance total approximately ~~10,673~~ 10,686 acres of potential desert vegetation and wildlife habitat that is or would be unavailable over the respective lives of these projects. However, the individual projects are dispersed over a regional area at least 20 miles long by 15 miles wide (approximately 300 square miles, or nearly 200,000 acres) in which large vacant tracts of land, with similar vegetation and wildlife habitat, remain.

Dispersed recreation and military uses of the area put added pressure on wildlife species, in particular on game species and on wildlife intolerant of human activities. Dispersed recreation and military uses of the area also

adversely impacts vegetation and habitat over wide, unconcentrated areas. However, most of these dispersed activities are intermittent and/or temporary, and except for small, localized areas of concentrated or recurrent use (e.g., campsites or OHV/ORV use areas), both vegetation and wildlife can typically tolerate the level of these activities.

Concern exists over the continuing loss of habitat, in particular the loss of microphyll woodland habitat which exists in the desert washes that intersect much of this general area. Because of the limited forage and cover available in the alluvial flats and uplands between the wash systems, the microphyll woodland is necessary for the success of many species which occur in the area. Microphyll woodland is considered important by the CDFG and a necessary component of the ecosystem for the continuing success of deer and other sensitive species which utilize the habitat. Based on ~~available~~ aerial photographs of the general area made available by Chemgold, it is roughly estimated that approximately 4-8 percent (i.e., about 7,680-15,360 acres) of the 300 square miles evaluated in this cumulative impact analysis may be microphyll woodland. Assuming that, on average, a ~~similar~~ comparable proportion (i.e., 4-8 percent) of the microphyll woodland habitat is directly impacted by surface disturbance within the areas of the combined projects, then a total of approximately 427-~~854~~ 855 acres of microphyll woodland has been or will be lost within the regional area evaluated over the combined lives of these projects. Insufficient information is available to make a cumulative assessment of the indirect impacts resulting from the identified projects or to distinguish between the temporary loss of habitat occurring over the life of the respective projects and the permanent loss of habitat after the respective projects have been closed.

Individual projects are required to implement measures to mitigate impacts on desert tortoise and other listed or sensitive plant and animal species, which reduces the potential for both individual and cumulative impacts to wildlife. With the dispersed nature of the projects and the implementation of the project-specific mitigation measures, the cumulative effects of the identified projects and uses on biological resources will be below the levels of significance.

5.3.4. Cultural Resources

Important cultural resources may exist in each of the identified cumulative project areas. Project-specific mitigation measures have and will be required to reduce the effects of the respective projects on cultural resources, generally to below the level of significance. Because of the large

distances between each of the located projects, and the relatively small percentage of the cumulative effects area which is subject to disturbance, no cumulative effects on individual cultural resources or resource assemblages would be expected. Recreation and military uses may result in adverse impacts on known or unidentified cultural resources over widely dispersed areas. However, the identified projects should not concentrate the otherwise dispersed recreational or military uses of the cumulative impact area such that a new or cumulative effect on cultural resources will result. As such, the cumulative effects of the identified projects and uses will be below the level of significance.

5.3.5. Visual Resources

Each of the identified projects are located, at least in part, on or adjacent to public lands administered by the BLM within the CDCA. Each of the projects is located within or adjacent to CDCA-designated limited- or moderate-use areas with BLM visual resource management objectives to retain or partially retain the existing character of the landscape. To the extent that these projects do not individually meet the respective visual resource objectives, they may individually have a significant effect on visual resources. However, except for the immediately adjacent Mesquite Mine and Mesquite Regional Landfill, no more than one of the projects are visible from any important viewing location within the cumulative impact study area. Because there is no cumulative increase or combined visual impact from the multiple projects, the cumulative effects of the projects on visual resources will be below the level of significance.

5.3.6. Noise

The individual projects generate noise which will be audible outside the respective project areas. However, the respective project areas are each located at great enough distances (approximately five to ten (5-10) miles) from the next nearest project or concentrated use that although particularly loud noises (such as blasting) may be audible between project areas, the sound levels would not typically be intrusive. With the implementation of typical project-specific mitigation measures, the identified projects are not expected to result in a significant cumulative noise impact.

6. OTHER REQUIRED CONSIDERATIONS

6.1. Relationship Between Local Short-Term Use of the Environment and the Maintenance and Enhancement of Long-Term Productivity

The principal existing land uses in the Project area are mineral exploration, outdoor recreation, and wildlife habitat. Implementation of the Proposed Action would commit approximately ~~1,648~~ 1,625 acres towards a single land use for the anticipated twenty (20)-year+ operational lifespan for the Project. Under the Proposed Action, approximately ~~1,612~~ 1,589 acres within the Project mine and process area would be completely fenced for security purposes. Wildlife would be precluded from accessing these areas during the operational life of the Project, as would recreational users.

Upon completion of mining activities, the Project area would be reclaimed and a majority of the existing land uses within the Project area could be re-established. However, the projected period before natural conditions return to an approximate pre-Project status is expected to exceed several decades following completion of the active life of the Project. The 227-acre East Pit and 34-acre Singer Pit would not be backfilled to the surface and would be reclaimed only to a level that would minimize potential risk to health and safety. Original wildlife habitat, or recreational land uses, would not be re-established in the East Pit and Singer Pit areas, although the pits would remain accessible for future mineral exploration and development and for selective wildlife habitat.

The Proposed Action would generate net socioeconomic benefits for the local and regional economy over the anticipated twenty (20) years of operation, and during the additional years until the completion of reclamation beyond the closure of mining and process operations. Approximately 50 to 100 construction workers, and 100 full-time workers, would be employed by the Project at various times. Total annual payroll for the 100 full-time employees would be approximately $ 5.93 million. Approximately $48 million in capital would be expended for the Project during 1997. Sales tax on these capital expenditures would amount to approximately $3.72 million. For each year thereafter, average annual capital expenditures would amount to approximately $1.7 million, yielding approximately $0.13 million per year in additional sales tax.

Annual non-capital expenditures are estimated to total $26 million. Property taxes in Imperial County are assessed at approximately 1.1 percent per year of the total assessed value. Depending on the assessed valuation of the Project property, projected property taxes are estimated to range between $250,000 and $600,000 per year. The development of mineral resources is in the national interest to satisfy

industrial and security needs. In providing these benefits, the Project would not preclude the long-term use of a majority of the Project area for other land uses.

6.2. Significant Irreversible and Irretrievable Resource Commitments

The topography of the Project mine and process area would be permanently altered by the waste rock stockpiles, heap, and the open East Pit and Singer Pit. This would also irreversibly alter the visual character of the Project mine and process area. The land comprising the Project mine and process area would be irreversibly altered through the excavation of the open pits and the creation of the waste rock stockpiles and heap. Following the completion of reclamation, much of the Project area would be able to support land uses similar to those which existed prior to the Project, although the changes would represent an irreversible commitment to the new landforms.

The extracted ground water and mineral resources represent irretrievable commitments of these local resources to the development of the Project. In addition, all of the energy, fuels, and other materials (such as processing chemicals) imported to the Project site which are consumed represent irreversible and irretrievable commitments of resources to the Project.

6.3. Growth-Inducing Effects

The Project would produce few, if any, growth inducing effects. Since the new 92 kV transmission line into the Project mine and process area would be removed following the completion of the Project, the Project would not produce, or require, the extension or expansion of any utilities or public services into the area which would remain to attract or stimulate subsequent developments. Project employment would not be of a size which would stimulate the development of additional growth of housing, schools, or other supporting infrastructure in either Imperial County, California or Yuma County, Arizona. Project expenditures, while substantial, would be spread between California, Arizona and other states, such that no significant economic stimulus to any individual economy would occur.

7. COORDINATION AND CONSULTATION

Several opportunities for coordination and consultation with agencies and the public were provided by the BLM and ICPBD at an early stage in the preparation of this EIS/EIR. The BLM published a Notice of Intent (NOI) to prepare an EIS in the Federal Register on March 24, 1995. A Notice of Preparation (NOP) of an EIR was distributed by Imperial County on April 5, 1995. Two (2) public scoping meetings were also held to receive public comments, identify concerns, and evaluate viable alternatives. Notices of these public hearings were distributed to approximately 200 news organizations by the BLM. A total of approximately 30 attended these meetings, including eleven (11) members of the public, and a total of sixteen (16) comment letters were received which addressed both specific and general issues regarding the Project. The comments received were used in the development of the scope and content of this EIS/EIR.

Copies of all of the notification documents, and comments received, are included in this EIS/EIR in Appendix ~~A~~ B. Additional information regarding the scoping process is presented in Section 1.5 of this EIS/EIR.

Specific additional consultations are being undertaken by the BLM with the USFWS pursuant to Section 7 of the federal Endangered Species Act (see Section 3.5.2) and the SHPO pursuant to Section 106 of the National Historic Preservation Act of 1966 (see Section 4.1.6.1), and by the ICPBD with the CDFG pursuant to the California Endangered Species Act (see Section 3.5.3).

In addition, the American Indian Religious Freedom Act (AIRFA) and the Executive Order of April 24, 1995 requires that local Native American groups be consulted regarding any proposed projects which may affect traditional religious practices, and the BLM has issued internal guidelines which instruct that this consultation should be initiated early in the project review or decision-making process, and be conducted at the highest levels within the BLM jurisdiction responsible for the decision. BLM has initiated this consultation process with the Quechan Tribe ~~Nation~~ regarding the Project, and Quechan Tribe ~~Nation~~ has requested that members be involved in study and development of the treatment plan for the Project. The consultation process is also ongoing as of the publication date of this EIS/EIR.

8. LIST OF PREPARERS

This Environmental Impact Statement/Environmental Impact Report (EIS/EIR) was prepared by the Bureau of Land Management, El Centro Resource Area Office (BLM-ECRA), and the Imperial County Planning~~-and-~~/Building Department (ICPBD). Agency staff which participated in the preparation of this EIS/EIR included:

Bureau of Land Management, El Centro Resource Area

Terry Reed, Area Manager
G. Ben Koski, Area Manager (retired)
Thomas Zale, Chief of Resources
Keith Shone, Environmental Coordinator
Pat Weller, Archaeologist
Arnold Schoeck, Recreation Specialist
Tim Finger, Wilderness Specialist
~~Christine Williams, Restoration Ecologist~~
Don Simon, Law Enforcement Ranger
Larry Caffey, Surface Compliance Specialist
Lynda Kastoll, Realty Specialist
Linda Self, Realty Specialist
Nancy Nicolai, Wildlife Biologist
Camille Forest, Geologist
Bob Bower, Recreation Specialist

Imperial County Planning~~-and-~~/Building Department (ICPBD):

Jurg Heuberger, Planning Director
Jesse Soriano, Planner III
~~Richard Cabanilla, Planner III~~
~~Kent Hector, Planner II~~

The BLM-ECRA and ICPBD were assisted in the preparation of this EIS/EIR by Environmental Management Associates, Inc. (EMA). EMA staff, their responsibilities for preparation of the EIS/EIR, and professional qualifications, are listed below:

Environmental Management Associates, Inc.

Dwight L. Carey, Principal: Principal-in-Charge and Project Manager; EIS/EIR preparation, Alternatives, Air Quality, ~~,~~Cultural Resources
D.Env. Environmental Science and Engineering, 1982, University of California, Los Angeles
M.S. Geology, 1976, University of California, Los Angeles
B.S. Geology, 1972, California Institute of Technology
20 years experience

Richard F. DeLong, Principal Specialist: Deputy Project Manager; EIS/EIR preparation, Alternatives, Visual Resources
M.S. Geology, 1986, University of Idaho
M.S. Resource Management, 1984, University of Idaho
B.A. Geology, 1980, California State University, Chico
15 years experience

Eric R. Mintz, Environmental Specialist: Document Coordinator; EIS/EIR preparation, Noise, Land Use, Socioeconomics, Utilities and Public Services
B.S. Water Resources, 1986, State University of New York at Oneonta
9 years experience

Dr. Terry Thomas, Principal: Deputy Document Coordinator; EIS/EIR preparation, Biological Resources
D.Env. Environmental Science and Engineering, 1982, University of California, Los Angeles
M.S. Plant Sciences, 1976, University of California, Riverside
B.S. Biology, 1974, University of California, Los Angeles
20 years experience

John Heggeness, R.G, R.E.G., Geologist: Geologic and Mineral Resources, Hydrologic Resources
M.S. Geology, 1981, University of Nevada, Reno
B.S. Geology, 1976, Utah State University
15 years experience

Daniel Davis, R.G., Geochemist: Geologic and Mineral Resources, Hydrologic Resources
M.S. Geochemistry, 1989, State University of New York at Stony Brook
B.S. Geosciences, 1985, University of Arizona
8 years experience

Kent Samuelson, Geologist: Geologic and Mineral Resources~~;~~, Soils
B.A. Geology, 1978, University at Boulder, Colorado
15 years experience

Peter Kraatz, Senior Engineer: Alternatives
B.S. Geology, 1984, University of California at Los Angeles
M.S. Geological Engineering, 1989, University of Nevada at Reno
12 years experience

Joseph M. DeStefano II, Environmental Specialist: Air Resources~~;~~
B.A. Political Science (Public Administration), 1992, Loyola Marymount University, Los Angeles
3 years experience

Teressa C. Casaceli, Associate Senior Environmental Specialist: Alternatives
B.A. Geology, 1980, Hartwick College, Oneonta, New York
11 years experience

Janet Tentler, Environmental Specialist: Document Production, Graphics
B.A. Environmental Studies, 1986, University at Hayward, California
8 years experience

The Applicant and its consultants provided technical reports for, or input into, the preparation of this EIS/EIR. These reports or this input was independently reviewed by the BLM-ECRA and ICPBD for accuracy and completeness.

Chemgold, Inc.

Steve Baumann, General Manager: EIS/EIR preparation coordination
C. Kevin McArthur, (former) Vice President and General Manager: EIS/EIR preparation coordination
Dan Purvance, Geologist: environmental studies coordination, hydrology, geology, and CADD support
Ron Wyrick, Metallurgist: project design
Dale Louks, Project Engineer: project design

Ted Rado, Consulting Wildlife Biologist

Biological Assessment, 1996
Biological Survey Report, May 1995

Ted Rado, Wildlife Biologist: tortoise surveys, general wildlife and plant inventory, deer sign survey, reptiles and amphibians, small mammal livetrapping, report preparation
Peter Woodman, Biological Consultant: tortoise surveys, general wildlife and plant inventory, plant surveys, bird surveys
Karen Jones, Wildlife Biologist: tortoise surveys, general wildlife and plant inventory, plant surveys, bird surveys
Ken Sweat, Field Biologist: tortoise surveys

ASM Affiliates, Inc.

Cultural Resources Inventory of Indian Pass: An Inventory and Evaluation for the Imperial Mine Project, Imperial County, California, July 1996
A Supplemental Cultural Resources Inventory and Evaluation of the Power Supply Route for the Imperial Project, Imperial County, California, September 1996.

Jerry Schaefer, Ph.D., SOPA, Archaeologist: principal investigator, document preparation

Bamberg Associates

Soil Resource Evaluation for Imperial Project, August 1995
Vegetation Baseline Survey, Imperial Project, Imperial County, California, August 1995

Samuel A. Bamberg, Ph.D., Principal Investigator
Ingrid E. Hanne

Paul R. Krausman

Desert Deer and the Chemgold Imperial Project, October 27, 1995

Paul R. Krausman, Ph.D., Professor and Research Scientist, Wildlife Ecology

Brown-Berry Biological Consulting

An Assessment of the Imperial Project Area With Respect To Bat Habitat and Occurrences, September 28, 1995

Patricia E. Brown, Ph.D., Wildlife Biologist: principal investigator

WESTEC, Inc.

WESTEC, Inc., 1994: Preliminary Hydrologic Analyses for the Imperial Mine Project, October, 1994.

WESTEC, Inc., 1995: Geotechnical Final Design Report for the Imperial Heap Leach Facilities, Imperial Gold Project (Draft), August 1995.

WESTEC, Inc., 1996: Baseline Report for the Imperial Project, February, 1996.

9. REFERENCES

Andrew, N., 1995: California Department of Fish and Game, Personal Communication, November 13, 1995.

Arizona Department of Commerce, 1994: Profile: Yuma County, Arizona, June 1994.

Arizona Public Service Company, Economic Development Department, and Azstats, 1994: Arizona Statistical Review, Edition 46.

ASM Affiliates, Inc, 1996a: Cultural Resources Inventory of Indian Pass: An Inventory and Evaluation for the Imperial Mine Project, Imperial County, California, July 1996.

ASM Affiliates, Inc, 1996b: A Supplemental Cultural Resources Inventory and Evaluation of the Power Supply Route for the Imperial Project, Imperial County, California, September 1996.

Bamberg, S.A., and I.E. Hanne, 1995a: Soil Resource Evaluation for Imperial Project. Report to Chemgold, Inc., Imperial Project, Bamberg Associates, August 1995.

Bamberg, S.A., and I.E. Hanne, 1995b: Vegetation Baseline Survey - Imperial Project, Imperial County, California. Report to Chemgold, Inc., Imperial Project, Bamberg Associates, August 1995.

Bedlinger, M.S., W.H. Langer, and W.R. Moyle. 1983. Maps Showing Ground-Water Units and Withdrawal, Basin and Range Province, Southern California. To Accompany Water Resource Investigation Report 83-4116-A. Department of the Interior, United States Geological Survey

Berry, K.H. 1972. Report on Tortoise Relocation Project, July 1971 to November 1971. Division of Highways, State of California, in Partial Fulfillment of Contract F-9353.

Berry, K.H. 1974. The Ecology and Social Behavior of the Chuckwalla, <u>Sauromalus</u> <u>obesus</u> <u>obesus</u> Baird. University of California Press, Berkeley. 60 pp.

Berry, K.H. 1975. Desert tortoise relocation project: status report for 1973. Department of Transportation, State of California. Contract F-9353. 37 pp.

Berry, K.H. and L.L. Nicholson. 1984. A summary of human activities and their impacts on desert tortoise populations and habitat in California. <u>In</u>: K.H. Berry (ed.): The status of the desert tortoise (*<u>Gopherus</u>* *<u>agassizii</u>*) in the United States. Rept. to the

U.S. Fish and Wildlife Service from the Desert Tortoise Council on Order No. 11310-0083-81. Pp. 61-117.

Berry, K.H. (ed.) 1984. The Status of the Desert Tortoise (Gopherus agassizii) in the United States. Rept. to the U.S. Fish and Wildlife Service from the Desert Tortoise Council on Order No. 11310-0083-81. 838 pp.

BioSystem Analysis. 1989. Endangered Species Alert Program Manual-Species Accounts and Procedures. Developed for the Southern California Edison Company Environmental Affairs Division, Rosemead, California.

Blong, B., 1993: Use of Habitat by Colorado Desert Deer; California Department of Fish and Game, 1993.

Bolster, B., 1989: The status of the flat-tailed horned lizard (*Phrynosoma mcalli*) in California. California Department of Fish and Game Report. 52 pp.

Brown, P.E., 1995: Possible Bat Occurrences on the Chemgold Imperial Project Site, September 28, 1995.

Brown, P.E. 1994: The California Leaf-Nosed Bat (Microtus californicus) and American Girl Mining Joint Venture-Impacts and Solutions. In: Proceedings VI: Issues and Technology in the Management of Impacted Wildlife. Pp. 54-56.

Brown, P.E. 1993: The California Leaf-Nosed Bat (Macrotus californicus) at the American Girl Mine. Abstract of Paper Presented March 10, 1993, at the California Mining Association Meeting in Monterey, California. Copy on File with American Girl Mining Joint Venture, Winterhaven, California. 2 pp.

Brown, P.E., 1992a: A Spring Survey of the American Girl Canyon Project and the Oro Cruz Project - Cargo Muchacho Mountains, Imperial County, California; American Girl Mining Joint Venture, Inc., June 5, 1992.

Brown, P.E. 1992b: A summer survey for the California leaf-nosed bat in the Cargo Muchacho Mountains. Prepared for the American Girl Mining Joint Venture, Winterhaven, California. 4 pp.

Brown, P.E. 1989: Bat inventory of the Oro Cruz Project, Cargo Muchacho Mountains, Imperial County, California. Copy on file with the American Girl Mining Joint Venture, Winterhaven, California. 8 pp.

Brown, P.E., R.D. Berry, and C. Brown. No date. Bats and Mines: Finding Solutions. Copy on file with American Girl Mining Joint Venture, Winterhaven, California. 3 pp.

Brown-Berry Biological Consulting, 1992: A Summer Survey for the California Leaf-Nosed Bat in the Cargo Muchacho Mountains; American Girl Mining Joint Venture, Inc., October 2, 1992.

Brown, P.E., Berry, R.D., Brown, C., 1994: The California Leaf-Nosed Bat (Macrotus Californicus) and American Girl Mining Joint Venture - Impacts and Solutions, 1994.

Burge, B.L. and W.G. Bradley. 1976: Population Density, Structure, and Feeding Habits of the Desert Tortoise (*Gopherus agassizii*) on a Low Desert Study Area in Southern Nevada. In: N.J. Engberg, S. Allan, and R.L. Young (eds.). Desert Tortoise Council Proceedings of the 1976 Symposium. Pp. 51-74.

Burge, B.L. and W.G. Bradley. 1976: Population Density, Structure, and Feeding Habits of the Desert Tortoise (Gopherus agassizii) on a Low Desert Study Area in Southern Nevada. In: N.J. Engberg, S. Allan, and R.L. Young (eds.). Desert Tortoise Council Proceedings of the 1976 Symposium. Pp. 51-74.

Burt, W.H. and R.P. Grossenheider. 1964: A Field Guide to the Mammals. Houghton-Mifflin Company, Boston. 284 pp.

California Air Pollution Control Officers Association (CAPCOA), 1993: CAPCOA Air Toxics "Hot Spots" Program Revised 1992 Risk Assessment Guidelines, Santa Barbara, California.

California Air Resource Board (CARB), 1994: California Air Quality Data, Summary of 1993 Air Quality Data; California Air Resource Board, Sacramento, California.

California Department of Finance, 1994: California Statistical Abstract, 1994.

California Department of Fish and Game, 1996a: Final Environmental Document Regarding Deer Hunting. (Table 5-14b. Zone D-12 expected buck ratio, population size, hunter kill and harvest buffer for alternatives)(April 10, 1996).

California Department of Fish and Game, 1996b: Memorandum - 1995 Final Deer Take Report.

California Department of Fish and Game 1995: Listed Species in Imperial County. (Revised 12/26/95).

California Department of Fish and Game. 1991. Annual Report on the Status of California State Listed Threatened and Endangered Animals and Plants. State of California publication, Sacramento. 192 pp.

California Department of Health Services, 1990: California Statewide Radon Survey Screening Results; California Department of Health Services, Sacramento, California.

California Department of Water Resources, 1965: Hydrologic Data: 1963, Bulletin No. 130-63, Volume V: Southern California, November 1965.

California Environmental Protection Agency, Air Resources Board, 1994: California Air Quality Data, Summary of 1993 Air Quality Data - Gaseous and Particulate Pollutants; California Environmental Protection Agency, Air Resource Board, Sacramento, California.

California Environmental Protection Agency, Air Resources Board, —1989, 1990, 1991, 1992, 1993, 1994.: California Air Quality Data, Summaries for 1988, 1989, 1990, 1991, 1992, and 1993 Air Quality Data - Gaseous and Particulate Pollutants; California Environmental Protection Agency, Air Resources Board, Sacramento, California.

California Native Plant Society. 1994: California Native Plant Society's Inventory of Rare and Endangered Vascular Plants in California. Special Publ. No. 1, Fifth Edition,Sacramento, California. 338 pp.

California Native Plant Society. 1988: California Native Plant Society's Inventory of Rare and Endangered Vascular Plants in California. Special Publ. No. 5, Sacramento, California. 168 pp.

Celentano, R.R., and J.R. Garcia, 1984: The Burro Deer Herd Management Plan; California Department of Fish and Game, March 1984.

Chemgold Inc., 1994a: Plan of Operations, Chemgold Inc. Imperial Project.

Chemgold Inc., 1994b: Reclamation Plan, Chemgold Inc. Imperial Project.

Clark, W.B., 1970: Gold Districts of California; California Division of Mines and Geology, Bulletin 193, 186 p.

Condor Minerals Management, Inc. 1991a. First Supplemental Environmental Impact Report for the Proposed Chemgold, Inc. Picacho Mine Dulcina Pit Phase 2, Imperial County, California. Prepared for Chemgold, Inc., Yuma, CA.

Condor Minerals Management, Incorporated. 1991b. Final Supplemental Environmental Impact Report for the Proposed Chemgold Inc. Picacho Mine Dulcina Pit Phase 2, Imperial County, California. Prepared for Chemgold, Incorporated, Yuma, Arizona.

County of Imperial, 1993a: Volume III- Final Environmental Impact Report for the County of Imperial, General Plan, Comments and Responses, Brian F. Mooney Associates, October 1993.

County of Imperial, 1993b: Volume II - Final Environmental Impact Report for the County of Imperial General Plan, Brian F. Mooney Associates, May 1993.

County of Imperial, 1993c: Volume 1- Final Program Environmental Impact Report for the County of Imperial General Plan, Brian F. Mooney Associates.

County of Imperial, 1993d: Draft Imperial County General Plan Update, Brian F. Mooney Associates.

County of Imperial, 1993e: Imperial County General Plan, Imperial County, California, Brian F. Mooney Associates.

County of Imperial, 1992: Imperial County, California, Facts and Figures for 1992.

Davis, J., and B. Schaefer, 1995: Burro Deer Herd D-12 Action Plan; California Department of Fish and Game - Region 5, 1995.

DeDyker and Associates. 1994. Draft Environmental Impact Statement, Oro Cruz Operator of the American Girl Mining Project. Prepared for the U.S. Bureau of Land Management, El Centro Resource Area Office, California.

Desert Tortoise Recovery Team. 1993a. Desert Recovery Plan for the Desert Tortoise (Mojave Population). Prepared for the U.S. Fish and Wildlife Service, Portland, Oregon. 173 pp. + append.

Desert Tortoise Recovery Team. 1993b. Proposed Desert Wildlife Management Areas for recovery of the Mojave population of the desert tortoise. Prepared for the U.S. Fish and Wildlife Service, Portland, Oregon. 139 pp.

Dutcher, L.C., W.F. Hardt, and W.R. Moyle, 1972: Preliminary Appraisal of Ground Water Storage with Reference to Geothermal Resources in the Imperial Valley Area, California, United States Geological Survey Circular 649.

Environmental Management Associates, 1995: Waste Characterization Study, prepared for Chemgold, Inc., Imperial Project, Imperial County, California, December 1995.

Environmental Management Associates, 1996a: Waters Study, prepared for Chemgold, Inc., Imperial Project, Imperial County, California, February 1996.

Environmental Management Associates, 1996b: Supplemental Waste Characterization Study, Imperial Project, Imperial County, California, September 1996.

Environmental Management Associates, 1996c: Supplemental Hydrology Study, Imperial Project, Imperial County, California, September 1996.

Environmental Solutions, Inc., 1994: Air Quality Analysis for the Mesquite Regional Landfill, March 1994.

Environmental Solutions, Inc., 1993a: Hydrogeology Technical Report for the Mesquite Regional Landfill, December 1993.

Environmental Solutions, Inc., 1993b: Faulting and Seismicity Report for the Mesquite Regional Landfill, December 1993.

Environmental Solutions~~.~~, Inc., 1987: Final Environmental Impact Report/Environmental Assessment for the Proposed VCR Mining Project, Imperial County, California. Prepared for the U.S. Department of Interior, Bureau of Land Management El Centro Resource Area Office. 184 pp. + append.

~~EPA, 1985: AP 42; Compilation of Air Pollutant Emission Factors; Environmental Protection Agency, Washington, D.C.~~

Faulkner, D.K. 1990: Current Knowledge on the Biology of the Moth Lacewing Oliarces clara Banks (Insecta: Neuroptera: Ithonidae). In: (M.W. Mansell and H. Aspock eds.): Proceedings of the Third International Symposium on Neuroptology. Paper presented in Pretoria, South Africa. Pp. 197-203.

Finger, T., 1995: Bureau of Land Management, El Centro Resource Area, Personal Communication.

Garrett, K. and J. Dunn. 1981: Birds of Southern California, status and Distribution. The Artisan Press, Los Angeles, California. 408 pp.

Grinnell, H.W. Review of the recent mammal fauna of California. Univ. Calif. Publ. Zool. 40:71-284.

o

GSi/Water, 1995: Preliminary Assessment of Aquifer Potential- Imperial County, California, January 24, 1995.

GSi/Water, 1993: Preliminary Assessment of Available Groundwater, Indian Rose Project, Imperial County, California, July 1, 1993.

Hall, E.R. 1981. Mammals of North America. 2nd Ed. John Wiley and Sons, New York.

Haywood, R.J., B.W. Anderson, and R.D. Ohmart, 1984: Habitat Use by Four Radio-Collared Mule Deer Along the Lower Colorado River; Center for Environmental Studies, Arizona State University, March 1984.

Heath, E.G., 1992: Faulting and Seismicity in the Vicinity of the Mesquite Regional Landfill. Letter report to Environmental Solutions, Inc. in Appendix D of the Final Environmental Impact Statement and Environmental Impact Report for the proposed Mesquite Regional Landfill, 1994.

Hickman, J.C. (ed.), 1993: The Jepson Manual, Higher Plants of California. University of California Press, Berkeley. 1,400 pp.

Hoffman, J.D., G.B. Gunnells, and J.M. NcNeal, 1991: National Geochemical Data Base: National Uranium Resource Evaluation Data for the Conterminous Western United States, U.S. Geological Survey, Washington D.C., DDS-1, 1991.

Ingles, L.G. 1964: Mammals of the Pacific States. Stanford University Press, California. 506 pp.

Imperial County Planning Commission, 1995: Notice of Declaration, April 26, 1995.

Imperial County Planning Department, 1978: Final Environmental Impact Report, Heber Geothermal Demonstration Project, Imperial County, California, March 1978.

Imperial Irrigation District and The Metropolitan Water District of Southern California, Agreement Relating to the Construction of a Concrete Lined Canal Parallel to the Existing All-American Canal, February 3, 1995.

Jaeger, E.C. 1941: Desert Wild Flowers. Stanford University Press, California. 322 pp.

Jennings, M.R. and M.P. Hayes. 1994: Amphibian and Reptile Species of Special Concern in California. Prepared for the California Department of Fish and Game, Inland Fisheries Branch, Rancho Cordova, California. 255 pp.

Jorgensen, N., 1995: Imperial County Department of Public Works, Personal Communication, November 21, 1995.

Joyner, W.B., and T.E. Fumal, 1986, Predictive Mapping of Earthquake Ground Motion. U.S. Geological Survey Professional Paper 1360, pp. 203-220, 1986.

Karl, A.E. 1994: Biological inventory for Mesquite Regional Landfill, Desert Tortoise Surveys. Prepared for Environmental Solutions, Irvine, California. 32 pp. + append.

Karl, A.E. 1992: Gosser Exchange properties, desert tortoise inventory. Prepared for Environmental Solutions, Irvine, California. 12 pp. + append.

Kiva Biological Consulting: 1991: Assessment of biological resources on a portions of Sections 10,11, 14 and 15 of T.14S.,R.22E., Picacho Mine, Imperial County, California. Prepared for Chemgold, Incorporated. 22 pp.

Klauber, L.M. 1939: Studies of reptile life in the arid southwest. Bull. Zool. Soc. San Diego 14:1-100.

Krausman, Paul, 1995: Desert Deer and the Chemgold Imperial Project, October 27, 1995.

Loeltz, O.J., B. Irelan, J.H. Robison, and F.H. Olmsted, 1975: Geohydrologic Reconnaissance of the Imperial Valley, California, United States Geological Survey Professional Paper 486-k.

Luckenbach, R.A. and R.B. Bury, 1983: Effects of off-road vehicles on the biota of the Algodones Dunes, Imperial County, California. J. Applied Ecology 20: 265-286.

Lyons, T., 1995: Imperial Irrigation District, Personal Communication.

Manfredi, T., 1995: U.S.M.C. - Yuma Air Station, Personal Communication.

Mayhew, W.W. 1965: Hibernation in the horned lizard Phrynosoma mcallii. Comp. Biochem. Physiol. 16:103-119.

Mayhew, W.W. and B.A. Carlson: 1986. Status of the flat-tailed horned lizard (Phrynosoma mcallii) in California. Final report prepared for the California Department of Fish and Game under Contract no. 85/86 C-1355. 34 pp.

McArthur, C.K., 1995: Chemgold, Inc., Personal Communication.

McArthur, C.K., 1995: Chemgold, Inc., Letter to Eric Mintz of EMA re: Socio-economic data for Imperial Project, July 27, 1995.

McCalvin, C. 1993: Surveys for seven rare plant species, the flat-tailed horned lizard, and the Colorado desert fringe-toed lizard. Report to Bureau of Reclamation. Boulder City, Nevada.

McIvor, D.E., J.A. Bissonette, and G.S. Drew, 1994. A Critical Review of the Status of the Yuma Mountain Lion, *Felis concolor browni*. Utah Coop. Fish and Wildlife Resource Unit (U.S. National Biological Survey) Report 94-1. 155 pages.

Medica, P.A., C.L. Lyons, and F.B. Turner. 1982: A comparison of 1981 populations of desert tortoises (*Gopherus agassizii*) in grazed and ungrazed areas in Ivanpah Valley, California. In: K. Hashagan (ed.): Desert Tortoise Council Proceedings of the 1982 Symposium. Pp. 99-124.

Messick, J.P. 1987: North American Badger. In: Wild Furbearer Management and Conservation in North America. Published by the Ministry of Natural Resources, Ontario, Canada. Pp. 586-597.

Miller, A.H. 1931: Systematic revision and natural history of North American shrikes (Lanius). Univ. Cal. Publ. Zool. 38:11-242.

Miller, A.H. and R.C. Stebbins. 1964: The Lives of Desert animals in Joshua Tree National Monument. University of California Press, Berkeley. 452 pp.

Brian F. Mooney and Associates, 1991: Cultural Resource Survey and Assessment of the Bema-Indian Rose Project Area, June 1991.

Morton, P.K., 1977, Geology and Mineral Resources of Imperial County, California: California Division of Mines and Geology, County Report No. 7, 104 p.

Munz, P.A. 1974: A Flora of Southern California. University of California Press. 1086 pp.

National Geographic Society. 1987: Field Guide to the Birds of North America. Second Edition. The National Geographic Society, Washington, D.C. 464 pp.

National Research Council (NRC), 1979: Surface Mining of Non-Coal Minerals, Prepared by the Committee on Surface Mining and Reclamation, Report No. ISBN-0-309-02942-2 (November).

Nevada Department of Wildlife (NDOW), 1992: Mining and Wildlife, Volume 1, Issue 2, Carson City, Nevada.

Norris, R.M., and R.W. Webb, 1976: Geology of California; John Wiley & Sons, Inc., New York.

Norris, K.S. 1949: Observations on the Habits of the Horned Lizard, Phrynosoma mcallii. Copeia 1949:176-180.

NRC, 1979: National Research Council, Surface Mining of Non-Coal Minerals. Prepared by the Committee on Surface Mining and Reclamation, Report No. ISBN-0-309-02942-Z.

Office of Arid Lands Studies. 1992: Botanical and Wildlife Analysis of the Proposed Mesquite Regional Landfill Study Area. Prepared for Environmental Solutions, Inc., Irvine, California. 74 pp. + append.

Olech, L.A. No date: Status of the Flat-Tailed Horned Lizard (Phrynosoma mcallii) on Bureau of Land Management Administered Land in California. U.S. Dept. of Interior, Bureau of Land Management, El Centro, California. 12 pp. + append.

Pechan, E.H. & Associates, Inc., 1993: State Implementation Plan for PM-10 in the Imperial Valley. Prepared for the Imperial County Air Pollution Control District, September, 1993.

Pritchett, L. 1984: Botanical Survey of the Gold Fields Mining Corporation Claims on Quartz Peak and Ogilby Quadrangles. Prepared for St. Clair Research Systems, Imperial College, El Centro, California. 35 pp.

Purvance, D., 1995: Chemgold, Inc., Letter to Peter Kraatz of EMA re: Imperial Project water analysis summary for water samples taken from drill holes within the mine and process area, October 3, 1995.

Rado, T., 1996: Biological Assessment, Chemgold Imperial Project, Imperial County, California, Prepared on behalf of the Bureau of Land Management, El Centro Resource Area.

Rado, T., 1996: Personal Communication, Feb. 9, 1996.

Rado, T., 1995: Biological Survey Report, Chemgold Imperial Project, California, May 1995.

Rado, T. No Date. Analysis of Actual and Potential Loss of Flat-Tailed Horned Lizard (Phrynosoma mcallii) Habitat. Draft. U.S. Dept. of Interior, Bureau of Land Management, Sacramento, California. 30 pp.

Rorabaugh, J.C., C.L. Palermo, and S.C. Dunn, 1987: Distribution and relative abundance of the flat-tailed horned lizard (*Phrynosoma mcalli*) in Arizona. Southwest. Natural 32(1): 103-109.

Rose, A.W., H.E. Hawkes, and J.S. Webb, 1979: Geochemistry in Mineral Exploration, Second Edition; Academic Press, New York, 657 p.

Schoeck, A., 1995: -Bureau of Land Management, El Centro Resource Area, Personal Communication.

Schwartzmann, J.L., and R.D. Ohmart. 1977: Quantitative vegetational data of desert tortoise habitat (Gopherus agassizii) habitat in the lower Sonoran Desert. In: M. Trotter and C.G. Jackson, Jr. (eds.): Desert Tortoise Council Proceedings of the 1977 Symposium. Pp. 112-115.

Skinner, M.W. and B.M. Pavlik. 1994: Inventory of Rare and Endangered Vascular Plants of California. Fifth edition. Published by the California Native Plant Society, Sacramento, California. 338 pp.

Smith, H.M. 1965. Handbook of Lizards: Cornell University Press, Ithaca, New York. 557 pp.

South Coast Air Quality Management District (SCAQMD) - Stationary Source Division, 1994: Permit Application Training Program Manual; South Coast Air Quality Management District, Diamond Bar, California.

SRK, 1989: Draft Acid Rock Drainage Technical Guide, Volume I.

State of California Economic Development Department, 1992a: Economic Development Department Annual Planning Information, Imperial County.

State of California Economic Development Department, 1992b: 1991 Statistical Abstract.

State of California Economic Development Department, 1993: Population Projections By Race/Ethnicity For California and its Counties 1990-2040, Report 93 P-1.

State of California Economic Development Department, Economic Development Department, 1991: Annual Planning Information, Imperial County.

Stebbins, R.C., 1985: A Field Guide to Western Reptiles and Amphibians. Houghton Mifflin Co., Boston, Mass.

Tierra Madre Consultants. 1987: Gold Fields Operating Company, VCR Mining Project, Desert Tortoise Report. Copy on File with the Bureau of Land Management El Centro Resource Area Office, California. 11 pp.

Thompson, J.R. and V.C. Bleich, 1993, A comparison of mule deer survey techniques in the Sonoran Desert of California. California Fish and Game 79(2): 70-75.

Tosdal, R.M., G.F . Willis, S.L. Manske, D. Lang, and M. Lusk, 1991: Mesquite Mining District, Southeastern California. Society of Economic Geology Field Trip. San Diego, California, October, 1991.

Turner, F.B., P.A. Medica, and H.O. Hill. 1980a: The status of the flat-tailed horned lizard (Phrynosoma mcallii) at nine sites in Imperial and Riverside Counties, California. Prepared for the U.S. Dept. of Interior, Bureau of Land Management, Riverside, California. Contract No. YA-512-CT8-58.

Turner, F.B., J.C. Rorabaugh, E.C. Nelson and M.C. Jorgensen. 1980b: A Survey of the Occurrence of the Flat-Tailed Horned Lizard (Phrynosoma mcallii) in California. Prepared for the U.S. Dept. of Interior, Bureau of Land Management, Riverside, California. Contract No. YA-512-CT8-58.

Turner, F.B. and P.A. Medica. 1982: The Distribution and Abundance of the Flat-Tailed Horned Lizard, Phrynosoma mcallii. Copeia 1982:815-823.

Turner, F.B., K.H. Berry, D.C. Randall and G.C. White. 1987: Population Ecology of the Desert Tortoise at Goffs, California, 1983-1986. Prepared Under Contract Between the Southern California Edison Company and the University of California, by a Memorandum of Understanding and Purchase Order (C1363901) between the Southern California Edison Company and the Bureau of Land Management, and by Contract DE-AC03-76-SF00012 between the U.S. Department of Energy and the University of California. 101 pp.

Turner, R.M. and D.E. Brown, 1982: Sonoran desert scrub. In Biotic Communities of the American Southwest-Unites States and Mexico. Desert Plants (4(1-4): 181-221.

U.S. Bureau of the Census, 1992: 1990 Census of Population and Housing, Public Law (P.L.) 94-171 Data (California).

U.S. Bureau of Economic Analysis, 1993: Region Economic Information System.

U.S. Bureau of Reclamation. 1996: Description and Assessment of Operations, Maintenance and Sensitive Species of the Lower Colorado River. Draft Biological Assessment Prepared for the U.S. fish and Wildlife Service and the Lower Colorado River Multi-Species Conservation Program. 226 pp.

U.S. Bureau of Land Management, California Desert District, and the Imperial County Planning and Building Department, 1995a: Final Environmental Impact Statement and Environmental Impact Report for the Proposed Mesquite Regional Landfill, Imperial County, California (CA-060-02-5440-10-B026).

U.S. Bureau of Land Management, 1995b: Record of Decision for the Oro Cruz Operation of the American Girl Mining Project, Imperial County, California, California Desert District, El Centro Resource Area, January 30, 1995.

U.S. Bureau of Land Management and the Imperial County Planning and Building Department, 1994a: Air Quality Assessment Report, Mesquite Regional Landfill (Appendix F), October 1994.

U.S. Bureau of Land Management, 1994b: Draft Environmental Impact Statement, Oro Cruz Operation of the American Girl Mining Project, April 1994.

U.S. Bureau of Land Management. 1994c: BLM Wilderness Areas, National Parks and Preserve Maps and Information. Copy on File with the Bureau of Land Management, California Desert District Office, Riverside, California.

U.S. Bureau of Land Management. 1992a: Solid Minerals Reclamation Handbook (BLM Manual Handbook H-3042-1.

U.S. Bureau of Land Management. 1992b: California Cyanide Management Plan. Prepared by the U.S. Department of Interior, Bureau of Land Management, Division of Mineral Resources, California State Office. 33 pp.

U.S. Bureau of Land Management and the Imperial County Planning and Building Department, 1993a: Hydrogeologic Assessment Report, Mesquite Regional Landfill (Appendix B), December 1993.

U.S. Bureau of Land Management and the Imperial County Planning and Building Department, 1993b: Faulting and Seismicity Report in the Vicinity of the Mesquite Regional Landfill (Appendix C), December 1993.

U.S. Bureau of Land Management and California Department of Fish and Game. 1992: California Statewide Desert Tortoise Management Policy. Prepared by the Bureau of

Land Management, California Desert District, Riverside, California, and the California Department of Fish and Game. 57 pp.

U.S. Bureau of Land Management. 1989: Environmental Assessment for Selected Control of the Common Raven to Reduce Desert Tortoise Predation in the Mojave Desert, California. Jointly Prepared by the U.S. Bureau of Land Management, U.S. Fish and Wildlife Service, and California Department of Fish and Game. 33 pp.

U.S. Bureau of Land Management, 1988: National Environmental Policy Act Handbook, BLM Handbook H-1790-1, 1-1547, October 15, 1988.

U.S. Bureau of Land Management, 1987 Amended California Desert Conservation Area Plan, 1987.

U.S. Bureau of Land Management, 1986a: Visual Resource Contrast Rating, Manual Section 8431-1.

U.S. Bureau of Land Management, 1986b: Visual Resource Inventory, Manual Section H-8410-1.

U.S. Bureau of Land Management, 1985: Visual Contrast Rating Worksheet, Manual Section 8400-4.

U.S. Bureau of Land Management and the Imperial County Planning and Building Department, 1984a: Final Environmental Impact Report/ Environmental Impact Assessment (EIR/EA) for the Proposed Mesquite Project, Imperial County, California, 1984.

U.S. Bureau of Land Management, 1984b: Visual Resource Management, Manual Section 8400.

U.S. Bureau of Land Management. 1980: The California Desert Conservation Plan, 1980. Prepared by the U.S. Dept. of Interior, Bureau of Land Management, California Desert Plan Program, Riverside, California. 173 pp.

U.S. Bureau of Land Management, 1978a: Environmental Assessment, Manual Section 8440, 1978.

U.S. Bureau of Land Management, 1978b: Application of Visual Resource Management Principles to Project Planning and Design, Manual Section 8430, 1978.

U.S. Bureau of Land Management. No Date: Management Strategy for the Flat-Tailed Horned Lizard (Phrynosoma mcallii) on Bureau of Land Management Administered Lands Within the California Desert Conservation Area. Copy on File with the Bureau of Land Management El Centro Resource Area Office, California. 36 pp. + append.

U.S. Bureau of Reclamation, 1994: Final Environmental Impact Statement/Final Environmental Report, All American Canal Lining Project, Imperial County, California, Lower Colorado Region, California Desert District, El Centro Resource Area, March 1994.

U.S. Department of Interior, 1995a: Overview and Status of the Northern and Eastern Colorado Desert Coordinated Management Plan, July 1995.

U.S. Department of Interior, 1995b: State of California Wilderness Status Map; U.S. Department of Interior/Bureau of Land Management, January 1995.

U.S. Department of Interior, 1994: BLM Wilderness Areas, National Parks and Preserve, Maps and Information, California; U.S. Department of Interior/Bureau of Land Management, October 1994.

U.S. Department of Interior, 1991: The California Desert, Why Mining Is Important, Division of Mineral Resources; Bureau of Land Management, April 1991.

U.S. Department of Interior, 1988: National Environmental Policy Act Handbook, BLM Handbook H-1790-1, 1-1547, October 15, 1988; Bureau of Land Management.

U.S. Department of Interior, 1980: The California Desert Conservation Area Plan Alternatives and Environmental Impact Statement, Bureau of Land Management, February 1980.

U.S. Department of Interior, Midway Well, Desert Access Guide #21, Bureau of Land Management, California Desert District.

U.S. Department of Interior, Pamphlet: Energy and Mineral Resources on the Public Lands, Bureau of Land Management.

U.S. Department of Interior, Pamphlet: California Imperial Sand Dunes Recreation Area, Bureau of Land Management, California Desert District.

U.S. Department of Interior, Pamphlet: National Back Country Byway Program, Bureau of Land Management.

U.S. Department of Interior, Bureau of Land Management - National Recreation Guide, Bureau of Land Management.

U.S. Department of Interior, Bureau of Land Management - Imperial Sand Dunes Recreation Area, Bureau of Land Management.

U.S. Environmental Protection Agency, 1985: Compilation of Air Pollutant Emission Factors (AP-42); Environmental Protection Agency, Washington, D.C.

U.S. Environmental Protection Agency, 1986: Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846); Environmental Protection Agency, Washington, D.C.

U.S. Fish and Wildlife Service (USFWS), 1990: Interim Techniques Handbook for Collecting and Analyzing Data on Desert Tortoise Populations and Habitats. Chapter III, *Protocols for Handling Live Tortoises*.

Virginia, R.A. and D.A. Bainbridge, 1987: Revegetation in the Colorado Desert: Lessons from the Study of Natural Systems. In Proceedings of the Second Native Plant Revegetation Symposium. April 15-18, 1987. San Diego, CA. University of Wisconsin Arboretum, Madison, Wisconsin: Society for Ecological Restoration and Management; 232 pp.

Weathers, W.W. 1983: Birds of Southern California's Deep Canyon. University of California Press, Berkeley. 266 pp.

Weaver, R.A. and J.L. Mensch, 1969: A Report on the Desert Bighorn Sheep in Eastern Imperial County, November 1968-January 1969, The Resources Agency, California Department of Fish and Game.

WESTEC, Inc., 1996: Baseline Report for the Imperial Project, February, 1996.

WESTEC, Inc., 1994: Preliminary Hydrologic Analyses for the Imperial Mine Project, October, 1994.

WESTEC, Inc., 1995: Geotechnical Final Design Report for the Imperial Heap Leach Facilities, Imperial Gold Project (Draft), August 1995.

WESTEC Services, 1988: Cultural Resource Inventory, Number 2, for 27 Drill Sites Within the Amir-Indian Rose Area Lease, March 1988.

WESTEC Services, 1987: Cultural Resource Inventory and Avoidance Program for 15 Drill Sites Within the Amir-Indian Rose Area Lease, July 1987.

Weaver, R.A. and J.L. Mensch. 1969: A Report on Desert Bighorn Sheep in Eastern Imperial County. The Resources Agency, Department of Fish and Game. Report W-51-R-14. 17 pp.

Western Ecological Services Company (WESCO). 1992: Biological Inventory of the Gosser Properties Mesquite Regional Landfill Project. Prepared for Environmental Solutions, Inc., Irvine, California. 31 pp. + append.

Western Resource Development. 1993: Biological Assessment, Oro Cruz Mining Operation for the Expansion of the American Girl Project, Imperial County, California. Prepared for the U.S. Bureau of Land Management, El Centro Resource Area Office, California. 76 pp.

Williams, D.F. 1986: Mammalian Species of Concern in California. California Dept. of Fish and Game, Wildl. Admin. Rept. 86-1. 112 pp.

Wilson, R.P., and S.J. Owen-Joyce~~ S.J.~~, 1994: Method to Identify Wells That Yield Water that will be Replaced by Colorado River Water in Arizona, California, Nevada, and Utah, ~~Wilson, R.P., Owen-Joyce S.J.,~~ United States Geological Survey Water Resources Investigations Report 94-4005, 1994.

Woodbury, A.M. and R. Hardy. 1948. Studies of the Desert Tortoise, Gopherus agassizii. Ecol. Mono. 18:145-200.

Yuma Economic Development Corporation, 1994: Yuma County, Arizona - A World of Opportunity for your Business, 1994/1995.

10. GLOSSARY AND LIST OF ACRONYMS

ACEC	Area of Critical Environmental Concern
ACHP	Advisory Council on Historic Preservation
ACOE	Army Corps of Engineers
afy	Acre-feet-per year
AIRFA	American Indian Religious Freedom Act
Amos-Ogilby-East Mesa Basin	A ground water basin of approximately 860 square miles located within the southeastern portion of Imperial County, California
AMSL	Above Mean Sea Level
ancillary area	Project ancillary area
ANFO	A mixture of ammonium nitrate and fuel oil, used as an explosive for blasting purposes
ANP	Acid Neutralization Potential
AP	Acid Potential
APE	area of potential effect
aquifer	Permeable strata of gravel or sand that serve as conduits for ground water flow
ATF	United States Bureau of Alcohol, Tobacco and Firearms
AWVTE	Average weekday vehicle trip ends
backfill	The process of refilling a mined-out pit with waste rock
BACT	Best Available Control Technology
bajadas	A type of plain found in arid or semi-arid regions, formed by deposition of debris in fan-shaped spreads, commonly as a result of sheet floods

barren solution	Non-precious metals-bearing dilute cyanide solution
bgs	below ground surface
BLM	Bureau of Land Management
BMSL	Below mean sea level
BP	Before Present
Bureau of Land Management	The agency of the United States Government, under the Department of the Interior, responsible for administering the public lands of the United States
CAA	Clean Air Act
CAAA	Clean Air Act Amendments
CAAQS	California Ambient Air Quality Standards
California Desert Conservation Area	Those public lands located in the California desert which have been identified by Congress in the Federal Land Policy and Management Act of 1976 as a unique area in need of special management by the Bureau of Land Management
California Desert Protection Act	A 1994 act which, among other things, gave wilderness designation to 69 individual areas of public land within the CDCA
California Environmental Quality Act	This act establishes the mechanisms by which government agencies in California document and consider the environmental implications of decisions made by the agency, and contains substantive provisions with which the government agencies must comply
California Regional Water Quality Control Board, Colorado River Basin Region (CRWQCB)	The California agency responsible for protection of the waters of the state in the Colorado River Basin Region, and for implementing California regulations, through the issuance of Waste Discharge Requirements, Waste Discharge Orders and National Pollution Discharge Elimination System permits

Cal-OSHA	California Occupational Safety and Health Act (or Administration)
Caltrans	California Department of Transportation
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CCR	California Code of Regulations
CDCA	California Desert Conservation Area
CDFG	California Department of Fish and Game
CDHS	California Department of Health Services
CEQA	California Environmental Quality Act
CESA	California ~~Environmental~~ Endangered Species Act
CFR	Code of Federal Regulations
Chemgold	Chemgold, Inc.
chipping station	An area which is comprised of a core and several flakes of the same worked material
CIP	Carbon-in-Pulp
cleared circle	Frequently interpreted as the archaeological remains of temporary shelters which were constructed or bent wooden poles and thatch
CMAGR	Chocolate Mountains Aerial Gunnery Range
CN^-	Free Cyanide
CNDDB	California Natural Diversity Data Base
CNPPA	California Native Plant Protection Act

CNPS	California Native Plant Society
CO	Carbon Monoxide
CO_2	Carbon Dioxide
Conditional Use Permit	The permit issued by Imperial County which authorizes certain activities in the county as a conditional use within certain zoned areas of the county
cone of depression	The depression in a watertable or piezometric surface produced by pumping
CRWQCB	California Regional Water Quality Control Board, Colorado River Basin Region
CSC	California Species of Concern
CUP	Conditional Use Permit
cyanide	A solid chemical compound (sodium or calcium cyanide) which is dissolved in water to form a solution suitable for the extraction of precious metals from ore by using a leaching process
desert pavement	An area consisting of stones that have been closely packed together to form a uniform, stony surface, generally without vegetation
DHS	California Department of Health Services
DWR	Department of Water Resources
EA	Environmental Assessment
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EMA	Environmental Management Associates, Inc,

endangered species	An animal or plant species which is in danger of extinction throughout all or a significant portion of its range
Environmental Assessment	An analytical document prepared under the National Environmental Policy Act that outlines the potential environmental effects of the Proposed Action and its possible alternatives and leads to a decision to prepare an Environmental Impact Statement or a Finding of No Significant Impact (FONSI)
Environmental Impact Report	A detailed statement prepared under the California Environmental Quality Act describing and analyzing the significant environmental effects of the proposed project and discussing ways to mitigate or avoid the effects
Environmental Impact Statement	An analytical document prepared under the National Environmental Policy Act that discusses the potential significant impacts to the human environment of a Proposed Action and its possible alternatives which is used by decision makers to weigh the environmental consequences of a potential decision
ephemeral	Temporary surface water flows occurring only after precipitation events
ESA	The federal Endangered Species Act of 1973
fanglomerates	A conglomerate formed by the lithifaction of an alluvial fan
FCR	field contact representative
fee land	Land in which the United States government has conveyed the fee simple interest in the surface, and possibly the minerals, into private ownership
FEMA	Federal Emergency Management Agency
FLPMA	Federal Land Policy and Management Act of 1976
GGX	Glamis Gold Exploration, Inc.
gpm	gallons-per-minute

HAP	hazardous air pollutant
H_2S	Hydrogen sulfide
HDPE	High Density Polyethylene
heap leach pad	A facility lined by impermeable material to collect the leach solutions which are slowly applied to a pile of ore placed in several layers, each approximately 25 feet in height, on top
Holocene	An Epoch of the Quaternary period, from the end of the Pleistocene (approximately 10,000 to 11,000 years ago) to the present
hydraulic conductivity	The quantity of water that will pass through a unit cross-sectional area of a porous material per unit of time under a hydraulic gradient of 1.00 at a specified temperature
hydraulic shovel	A hydraulically powered and operated device used to lift and load large quantities of material
ICAPCD	Imperial County Air Pollution Control District
ICDPW	Imperial County Department of Public Works
ICPBD	Imperial County Planning ~~and~~/Building Department
IID	Imperial Irrigation District
ISDRA	Imperial Sand Dunes Recreational Area
Imperial County Planning and Building Department	Local Lead Agency responsible for implementing the California Surface Mining and Reclamation Act (SMARA) and the California Environmental Quality Act (CEQA), and for approving a Conditional Use Permit (CUP) with accompanying Reclamation Plan subject to conditions
isolates	Less than five (5) artifacts in a 2.5 square meter area
Jurassic	The period of time extending from 195 million years to 135 million years, having a duration of 60 million years

Key Observation Points	Points which were selected as representative of the possible views of a project area
KOPs	Key Observation Points
LCRS	Leachate Collection and Recovery System
leachate	Solution of soluble materials which is formed from percolation of water through strata
leached ore	The ore that has been leached of its precious metals by the leaching solution on the heap leach pad
lithic scatter	Surface scatters of flaked stone tools and manufacturing debris
lode	A mineral deposit that is contained within bedrock, as opposed to a placer deposit
MCL	Maximum Contaminant Level
Miocene	The epoch of the Tertiary period between the Oligocene and the Pliocene epochs
migratory bird	Any bird, whatever its origin and whether or not raised in captivity, which belongs to species listed in Section 10.13 of the Migratory Bird Treaty Act (16 USC 701-718h), or which is a mutation or a hybrid of any such species, including any part, nest, or egg of any such bird, or any product, whether or not manufactured, which consists, or is composed in whole or part, of such bird or part, nest, or egg thereof; all birds are considered migratory with the exception of: (a) the English sparrow; (b) starlings; and (c) barnyard pigeons.
mine and process area	See Project mine and process area
mineralized potential area	The area which co-joins the proposed ore pits and which delineates the outer boundary of potential mining activity
MSHA	Mining and Safety Health Administration
MWD	Metropolitan Water District

NAAQS	National Ambient Air Quality Standards
National Environmental Policy Act	The act that established the procedures by which the environmental consequences of a decision by agencies of the federal government are analyzed and documented prior to the decision being made
NECDEMP	Northern and Eastern Colorado Desert Coordinated Management Plan
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NOI	Notice of Intent
NO_x	Oxides of Nitrogen
NO_2	Nitrogen Dioxide
NORM	Naturally Occurring Radioactive Materials
NP	Neutralization Potential
NOP	Notice of Preparation
NPDES	National Pollutant Discharge Elimination System Permit
NRC	National Research Council
NRE	National Register Eligible
NRHP	National Register of Historic Places
NURE	national uranium resource evaluation
NVD	Night Vision Device
NVG	Night Vision Goggle
OHWM	ordinary high water mark

O_3	Ozone
OHV	Off-Highway Vehicle
open pit	The area from which ore and waste rock are removed
ORV	Off-Road Vehicle
OSHA	Occupational Safety and Health Administration
Overbuilding	Overbuilding consists of installing new, taller, wooden poles adjacent to existing wooden poles; installing higher voltage conductors near the top of new poles; moving the existing lower voltage conductors from existing poles to below the higher voltage conductors on new poles; then removing the existing poles
patented land	A mining claim for which the United States government has conveyed the fee simple interest in the surface and minerals into private ownership
Pb	Lead
petroglyph	A picture that has been etched onto a rock surface
placer	A deposit of mineral resources which is formed by an alluvial process and contained within alluvial material
Plan of Operation	A document prepared by the proponent of any mining development of locatable minerals and filed with the Bureau of Land Management, which presents a detailed discussion of the proposed project
Pleistocene	The first epoch of the Quaternary Period in the Cenozoic Era, characterized by the spreading and recession of continental ice sheets, and the appearance of modern man
Pliocene	The last epoch of the Tertiary Period in the Cenozoic Era, during which many modern plants and animals developed
PM_{10}	Particulate matter that is less than 10 microns in diameter

PMP	Probable Maximum Precipitation
POO	Plan of Operation
PPE	HDPE/polypropylene
PSD	Prevention of Significant Deterioration
porosity	The percentage of the bulk volume of rock, sediment, or soil that is occupied by interstitial spaces
pot drops	Pottery concentrations where individual pots were accidentally or intentionally broken and abandoned. Pot drops are often found along trails or near water sources
Precambrian	An era of geological time preceding the Paleozoic era, before 570 million years ago. Approximately 90 percent of all geological time occurred within this period
pregnant solution	A precious metals-bearing cyanide solution which contains sufficient quantities of gold and silver that can be sent to the precious metal recovery plant to remove the precious metals from the solution
Project area	Includes the Project mine and process area and the Project ancillary area
Project ancillary area	Used to describe the Project area excluding the mine and process area, which contains the ground water production wells and water pipeline, the electrical power metering station and new 92 kV transmission line, and the relocated portions of Indian Pass Road
Project mine and process area	Used to describe the Project area excluding the ancillary facilities area, which contains the open pits, waste rock stockpiles, soil stockpiles, administrative offices and maintenance facility area, heap leach facility, precious metals recovery plant and other facilities, internal roads, and the on-site diesel fuel generators if constructed

Proposed Action	A description of the project as proposed by the project proponent in the Plan of Operations and/or the Conditional Use Permit application
public land	Any land and interest in land owned by the United States within the states and administered by the Secretary of the Interior through the Bureau of Land Management, without regard to how the United States acquired ownership, except: (1) lands located on the Outer Continental Shelf; and (2) lands held for the benefit of Indians, Aleuts, and Eskimos
Quaternary	The second period of the Cenozoic era covering the past two (2) to three (3) million years
RACM	Reasonably Available Control Measures
Reclamation Plan	A document submitted to the Bureau of Land Management and Imperial County, the respective federal and local Lead Agencies, that details the specific measures to be taken by the project proponent to reclaim the project lands during mining operations and after mining and leaching have been completed
ROCs	Reactive organic chemicals
ROGs	Reactive organic gases
ROM	Run-of-Mine
ROW	Right-of-Way
Run-of-Mine	Describes ore which is not crushed prior to processing
Salton Trough	A landward extension of the East Pacific Rise, a zone of rifting and crustal spreading which created the Gulf of California
SBB&M	San Bernardino Baseline & Meridian
SCAQMD	South Coast Air Quality Management District

SEDAB	Southeast Desert Air Basin
sensitive receptor	In general, areas of habitation where the intrusion of noise has the potential to adversely impact the occupancy, use or enjoyment of the environment; sensitive receptors include, but are not limited to, residences, schools, hospitals, parks and office buildings
sensitive species	Plant or animal species which are susceptible or vulnerable to activity impacts or habitat alterations; a plant or animal species recognized as being depleted, rare, threatened, or endangered and recognized as requiring special management to prevent placement on federal or state lists
SHPO	State Historic Preservation Officer
significant environmental impact	A substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance
SMARA	Surface Mining and Reclamation Act
SOCAB	South Coast Air Basin
soil stockpile	Locations within the mine and process area where excavated soils are stockpiled for future revegetation purposes
SO_2	Sulfur dioxide
SO_4	Sulfur
SO_x	Sulfur oxides
SPLP	Synthetic Precipitation Leaching Procedure
solution ditch	An above-ground, trough-shaped structure that is lined with an impermeable material and engineered to convey cyanide solution from the heap leach pad to the solution pond; none will be used for the Imperial Project

solution pond	A bowl-shaped structure that is lined with an impermeable material and engineered to contain cyanide solution from the heap leach pad for processing in the precious metals recovery plant and subsequent recirculation to the heap leach pad
Surface Mining and Reclamation Act	An act passed by the California legislature which prescribes the reclamation of mined lands within the state of California and directs the Counties within the state to review and approve a Reclamation Plan of each mining operation as part of the County's Conditional Use Permit process
swell factor	Term used to describe condition whereby broken rock occupies a greater volume than the same weight of solid rock
TDS	Total Dissolved Solids
T/E	Threatened and Endangered
transmissivity	The rate at which water is transmitted through a unit width of an aquifer under a unit hydraulic gradient which is typically expressed in units of gallons per day per foot
TPY	tons per year
TSP	Total Suspended Particulates
TTLC	Total Threshold Concentration Limit
UBC	Uniform Building Code
unnecessary or undue	In conjunction with the degradation of lands, describes activities which would cause environmental impacts greater than what would normally occur for specific activities, or would be necessary to conduct specific activities
Unpatented	A mining claim for which the United States government has not conveyed the fee simple interest in the surface and minerals into private ownership
USBR	United States Bureau of Reclamation

USDI	United States Department of Interior
USDOE	United States Department of Energy
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
USMC	United States Marine Corps
vadose zone	The unsaturated zone above the water table
Visual Resource Management System	The Bureau of Land Management system used to identify visual values; establish objectives for managing these values; and provide information to evaluate the visual effects of proposed projects
VFR	Visual Flight Rule
VRM	Visual Resource Management
WAPA	Western Area Power Authority
Waste Discharge Requirements	A permit issued by the California Regional Water Quality Control Board which governs the construction, operation and closure of the heap leach pad, process ponds and the precious metals recovery plant
waste rock stockpile	Location within the mine and process area where excavated waste rock from the pits is stockpiled
WSA	Wilderness study area

11. INDEX

~~[NOTE TO THE READER OF THE PROOF DRAFT EIS/EIR: The Index will be completed once the text of the Draft EIS/EIR has been accepted by the BLM and ICPBD]~~

APPENDIX A

CHEMGOLD, INC. IMPERIAL PROJECT
RECLAMATION PLAN

Revised Copy of October 1, 1996

APPENDIX ~~A~~ B

SCOPING DOCUMENTS

Revised Copy of October 1, 1996

APPENDIX ~~B~~ C-1

CHEMGOLD, INC. IMPERIAL PROJECT
WASTE CHARACTERIZATION STUDY

Revised Copy of October 1, 1996

APPENDIX C-2

SUPPLEMENT TO CHEMGOLD, INC. IMPERIAL PROJECT WASTE CHARACTERIZATION STUDY

Revised Copy of October 1, 1996

~~APPENDIX C~~

~~CHEMGOLD, INC. IMPERIAL PROJECT~~
~~RECLAMATION PLAN~~

Revised Copy of October 1, 1996

APPENDIX D

WATERS STUDY, CHEMGOLD INC., IMPERIAL PROJECT, IMPERIAL COUNTY, CALIFORNIA

Revised Copy of October 1, 1996

APPENDIX E-1

HYDROLOGY BASELINE REPORT FOR THE IMPERIAL PROJECT
IMPERIAL COUNTY, CALIFORNIA

Revised Copy of October 1, 1996

APPENDIX E-2

SUPPLEMENT TO HYDROLOGY BASELINE REPORT FOR THE IMPERIAL PROJECT
IMPERIAL COUNTY, CALIFORNIA

Revised Copy of October 1, 1996

APPENDIX F

VEGETATION BASELINE SURVEY, IMPERIAL PROJECT,
IMPERIAL COUNTY, CALIFORNIA

Revised Copy of October 1, 1996

APPENDIX G

BIOLOGICAL SURVEY REPORT, CHEMGOLD IMPERIAL PROJECT, CALIFORNIA

Revised Copy of October 1, 1996

APPENDIX H

POSSIBLE BAT OCCURRENCES ON THE CHEMGOLD IMPERIAL PROJECT SITE

APPENDIX I

DESERT DEER AND THE CHEMGOLD IMPERIAL PROJECT

Revised Copy of October 1, 1996

APPENDIX J-1

CULTURAL RESOURCES INVENTORY OF INDIAN PASS: AN INVENTORY AND EVALUATION FOR THE IMPERIAL MINE PROJECT, IMPERIAL COUNTY, CALIFORNIA

Revised Copy of October 1, 1996

APPENDIX J-2

A SUPPLEMENTAL CULTURAL RESOURCES INVENTORY AND EVALUATION OF THE POWER SUPPLY ROUTE FOR THE IMPERIAL PROJECT, IMPERIAL COUNTY, CALIFORNIA

Revised Copy of October 1, 1996

APPENDIX K

VISUAL CONTRAST RATING SHEETS

APPENDIX L

CHEMGOLD IMPERIAL PROJECT
AIR QUALITY ANALYSIS

Revised Copy of October 1, 1996

_______, 1996

Dear Reader:

We are pleased to provide this Draft Environmental Impact Statement and Environmental Impact Report (EIS/EIR) for the proposed Imperial Project for your review and comment. The proposed project would be located on public lands in eastern Imperial County. The purpose of this document is to provide information to the public, as well as Cooperating and Responsible agencies regarding the environmental consequences of establishing the proposed open-pit, heap-leach, precious metal mine. Various technical reports have been prepared which have been used in the preparation of this Draft EIS/EIR. Copies of the technical reports are available for review at the libraries listed herein, the Imperial County Planning/Building Department and Bureau of Land Management (BLM) office in El Centro, California.

To facilitate review, this document has been prepared as an Environmental Impact Statement (EIS) in compliance with the National Environmental Policy Act (NEPA) and implementing regulations. The Bureau of Land Management is the lead agency for the purpose of compliance with the requirements of NEPA for the proposed project.

This document has also been prepared as an Environmental Impact Report (EIR) in compliance with the California Environmental Quality Act (CEQA) and implementing regulations and guidelines. The County of Imperial is the lead agency for the purpose of compliance with the requirements of CEQA for the proposed project.

Comments concerning the adequacy or accuracy of this Draft EIS/EIR will be considered in preparation of the Final EIS/EIR. A 90-day public review period has been established for this document. In addition, two public hearings will be held during the public comment period to receive verbal testimony on the following dates: _______, 1996, at _______, California _____ (619/___-____); and _______, 1996, and at _______, California _____ (619/___-____). Written comments on this document will be accepted through _______, 1996, and should be addressed to:

Bureau of Land Management
1661 South 4th Street
El Centro, California 92243

For information concerning the federal aspects of the project, including comments on the EIS, contact the BLM at (619) 337-4412. For information concerning non-federal aspects of the project, including comments on the EIR, contact Jurg Heuberger of Imperial County at (619) 339-4236, Extension 310.

Respectfully submitted,

Terry Reed
Area Manager
El Centro Resource Area

Jurg Heuberger, AICP, CEP
Planning Director
County of Imperial

LIBRARY LIST

BLM Library SC-322A
Bldg. 50, Denver Federal Center
P.O. Box 25047
Denver, CO 80225

Brawley Public Library
400 Main Street
Brawley, CA 92227

SDSU Library
720 Heber Avenue
Calexico,CA 92231

Imperial County Library
1647 West Main Street
El Centro, CA 92243

Imperial County Free Library
939 West Main Street
El Centro, CA 92243

Imperial Public Library
P.O. Box 38
Imperial, CA 92251

Arizona Western College Library
P.O. Box 929
Yuma, AZ 85366

Ft. Yuma Indian Reservation Library
Tribal Library - Quechan Tribe
P.O. Box 1899
Yuma, AZ 85366-1899

Palo Verde District Library
125 W. Chanslor Way
Blythe, CA 92225

Calexico City Library
850 Encinas Avenue
Calexico, CA 92231

Meyer Memorial Library
225 West Main Street
Calpatria, CA 92233

El Centro Public Library
539 State Street
El Centro, CA 92243

Imperial Valley College Library
380 East Aten Road
Imperial, CA 92251

Holtville Library
101 East Sixth Street
Holtville, CA 92250

Yuma County Library District
350 South 3rd Avenue
Yuma, AZ 85364

IMPERIAL PROJECT
IMPERIAL COUNTY, CALIFORNIA

DRAFT
ENVIRONMENTAL IMPACT STATEMENT/
ENVIRONMENTAL IMPACT REPORT

VOLUME I
(~~without Appendices~~ including Appendix A)

State Clearinghouse No. 95041025

~~JULY~~ OCTOBER 1996

Applicant

Chemgold, Inc.

Prepared By:

U.S. Department of the Interior
Bureau of Land Management

County of Imperial
Planning and Building Department

Henri R. Bisson — Date
District Manager
California Desert District

Jurg Heuberger, AICP — Date
Planning Director
County of Imperial

Revised Copy of October 1, 1996

Imperial Project, Imperial County, California
Plan of Operations Approval and Right-of-Way Approval
Imperial County Conditional Use Permit~~,~~ and
Reclamation Program Approval
Draft Environmental Impact Statement/Environmental Impact Report

Lead Agencies:

U.S. Department of the Interior
Bureau of Land Management
California Desert District
El Centro Resource Area

County of Imperial
El Centro, California

Prepared By:

Environmental Management Associates, Inc.

For Information Contact:

Keith Shone
Bureau of Land Management
1661 S. 4th Street
El Centro, California 92243
(619) 337-4412

Jesse Soriano
Imperial County Planning~~and~~
/Building Department
939 Main Street
El Centro, California 92243
(619) 339-4236

Abstract:

The Imperial Project (Project) is a proposal by Chemgold, Inc. to develop an open-pit, precious metal mining operation utilizing heap leach processes. The proposed site is located in eastern Imperial County, California, approximately 45 miles northeast of El Centro, California and 20 miles northwest of Yuma, Arizona. The Project area is comprised of approximately ~~1,648~~ 1,625 acres of unpatented mining claims on public lands administered by the U.S. Bureau of Land Management (BLM), El Centro Resource Area Office, of the California Desert District.

Up to 150 million tons of ore would be leached and 450 million tons of waste rock would be deposited at the proposed waste rock stockpiles or the mined-out portions of the three (3) planned open pits. The expected maximum average mining rate would be 130,000 tons per day. Approximately ~~1,400~~ 1,392 acres of surface disturbance would occur as a result of the Proposed Action. Mining activities would be performed 24 hours per day, seven (7) days per week, and are projected to commence in 1997 and terminate around the year 2016. Reclamation activities would likely continue beyond the year 2016.

The proposed mine would include a lined heap leach pad designed and constructed to support and contain the ore heap and to collect process fluid from the treated heap for precious metal recovery. Blasted ore rock would be mined and hauled directly to the heap without crushing (run-of-mine). Blasted waste rock would be hauled directly to a waste rock stockpile or to one of the on-site pits to be backfilled.

A ground water production well field, consisting of up to four (4) ground water production wells, would be completed and used to provide water for processing operations, dust control and domestic uses. —Electrical power would be supplied by a local utility company. Emergency power during periods of utility service interruption would be provided by a diesel-powered, electric generator located near the processing facility in the Project mine and process area.

The Proposed Action incorporates mitigation measures ~~such that most~~ to reduce the significance of impacts to the human environment ~~would not be significant~~. However, mine construction, operations, facilities, and conditions would visually contrast with the surrounding landscape and would conflict with California Desert Conservation Area visual objectives for Class II areas. The Proposed Action would generate up to 100 local job opportunities, would involve $48 million in initial capital expenditures, $1.7 million per year in continuing capital expenditures, and $26 million per year in non-capital expenditures including payroll. In addition, the Project would pay sales tax on expenditures and pay local property taxes on mine assets. These would be beneficial effects of the Proposed Action.

Alternatives to the Proposed Action include:

- Reduced Project Alternative;
- Complete Pit Backfill Alternative; and
- No Action Alternative.

Additional alternatives were considered, but were eliminated from further detailed discussion in the EIR/EIS on the basis of environmental and operational factors.

Federal, State, and Local Agency Authorizing Actions Required for the Imperial Project

Approval of Plan of Operations for mine and process operations from BLM;

Right-of-Way approval for relocation of Indian Pass Road;

Right-of-Way approval for new and rebuilt transmission lines;

Issuance of Record of Decision from the BLM;

Biological Opinion from the U.S. Fish and Wildlife Service with formal consultation from the BLM in conformance with Section 7 of the federal Endangered Species Act;

~~Notification of Nationwide Permit Use~~ Individual Clean Water Act Section 404 Permit from the U.S. Army Corps of Engineers;

User of High Explosives Permit from the Bureau of Alcohol, Tobacco and Firearms;

Explosives Permit from the Imperial County Sheriff;

Waste Discharge Requirements for discharge of wastes to land from the California Regional Water Quality Control Board, Colorado River Basin Region;

Certification of Compliance with Section 401 of the federal Clean Water Act from the California Regional Water Quality Control Board, Colorado River Basin Region;

California Endangered Species Act (Fish and Game Code Section 2081) Management Permit from the California Department of Fish and Game;

Stream or Lake Alteration Agreement (Fish and Game Code Section 1601 or 1603) from the California Department of Fish and Game;

Section 106 process with the California State Office of Historic Preservation;

Conditional Use Permit from the Imperial County Planning~~ and ~~/Building Department for drilling ground water production wells;

Reclamation Plan approval from the Imperial County Planning~~ and ~~/Building Department for Project mine and process facilities;

Building Permits and Certificate of Occupancy from the Imperial County Planning~~ and ~~/Building Department;

Individual Septic Disposal System Permit from the Imperial County Department of Health Services;

Authority to Construct applicable air pollution emission units from the Imperial County Air Pollution Control District;

Permit to Operate applicable air pollution emission units from the Imperial County Air Pollution Control District;

Encroachment Permit from the Imperial County Department of Public Works and Road Revocation from the Imperial County Board of Supervisors for Project access off, and relocation of, Indian Pass Road; and

Plan Review by the Imperial County Fire Department for conformance with Uniform Fire Code.

IMPERIAL PROJECT
DRAFT ENVIRONMENTAL IMPACT STATEMENT/
ENVIRONMENTAL IMPACT REPORT

VOLUME I

SUMMARY

PURPOSE OF THIS DOCUMENT

The purpose of this Draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR) is to analyze the potential impacts of, and mitigation measures for, the proposed Imperial Project (Project) and reasonable alternatives for a conventional open-pit, heap-leach, precious metal mine proposed by Chemgold, Inc. The Project would be located on public lands in eastern Imperial County, California. This EIS/EIR is being jointly prepared by the U.S. Department of Interior, Bureau of Land Management (BLM), which is the Lead Agency with respect to compliance with the National Environmental Policy Act (NEPA) and its implementing regulations, and the Imperial County Planning~~and~~/Building Department (ICPBD), which is the Lead Agency responsible for compliance with the California Environmental Quality Act (CEQA). The purpose of this joint EIS/EIR is to provide decision-makers in all agencies required to approve authorizing actions with sufficient information to (1) make informed decisions regarding the anticipated significant impacts of the Project; and (2) determine if possible mitigation measures or alternatives are available which could reduce those identified impacts of the Project to below the level of significance. This joint EIS/EIR is also intended to provide this same information about the proposed Project to the concerned public and solicit their comments.

As the federal agency responsible for management of the Project area land and minerals, the BLM has assumed responsibility as the Lead Agency with respect to compliance with the National Environmental Policy Act (NEPA) (Public Law 91-90, 42 U.S.C. 4321 *et seq.*). This document is being prepared as an EIS in compliance with NEPA, the Council of Environmental Quality regulations implementing NEPA (40 CFR 1500-1508), and the Bureau of Land Management (BLM) guidelines for implementing NEPA (USDI, 1988).

As the local agency responsible for implementing the California Surface Mining and Reclamation Act of 1975 (SMARA) for the Project, the ICPBD has assumed responsibility as the Lead Agency with respect to compliance with the California Environmental Quality Act (CEQA) (Public Resources Code 21000 *et seq.*). This document is being prepared as an EIR in compliance with CEQA, the Guidelines for the Implementation of CEQA (CEQA Guidelines) (14 CCR 15000 *et seq.*), and Imperial County guidelines for the preparation of an EIR.

This joint EIS/EIR has been prepared in two (2) separate volumes. Volume I of this document contains this Summary, the Table of Contents, ~~and~~ Chapters 1 through 11, and Appendix A (the Imperial Project Reclamation Plan). Volume II contains all of the other appendices.

PROPOSED ACTION

Chemgold, Inc. has proposed the development of a conventional open-pit, heap leach, precious metal mine, the Imperial Project (Project), to be located in eastern Imperial County, California, approximately 45 miles northeast of El Centro, California and 20 miles northwest of Yuma, Arizona (Figure S-1). The Project area consists of unpatented mining claims on public lands administered by the U.S. Bureau of Land Management (BLM), El Centro Resource Area Office, of the California Desert District, which are located within portions of Sections 28, 29, 30, 31, 32 and 33, Township 13 South, Range 21 East, and Sections 4, 5, 6, 7, and 8, Township 14 South, Range 21 East, San Bernardino Baseline & Meridian (SBB&M) (Figure S-2). The Project would be located south of State Route 78 and north of Interstate Highway 8 and would be accessed via Ogilby Road, a secondary paved road, and Indian Pass Road, a County-maintained dirt road. Some light vehicles could also occasionally access the Project area via BLM Route A278, Hyduke Road.

Up to 150 million tons of ore would be mined and leached under the Proposed Action, and up to 450 million tons of waste rock would be mined and deposited in the waste rock stockpiles or the mined-out portions of the open pits, at a maximum average mining rate of 130,000 tons per day. Mining activities, performed 24 hours per day and seven (7) days per week, are projected to commence in 1997 and terminate around the year 2016. Reclamation activities would likely continue beyond the year 2016.

The Project mine and process area would contain all of the open pits, waste rock stockpiles, soil stockpiles, administration office and maintenance facility area, heap leach facility, precious metal recovery plant and other facilities, internal roads, and the on-site diesel-fueled emergency power generator. A maximum of approximately ~~1,364~~ 1,356 acres of surface disturbance would be created within the approximately ~~1,612~~ 1,589-acre mine and process area (Figure S-3). The ground water production wells and water pipeline, the electrical power metering station and new 92 kV/7.2 kV transmission line, and a relocated portion of Indian Pass Road, would be located on or near Indian Pass Road outside of the Project mine and process area and result in an additional 36 acres of surface disturbance (Figure S-3). The building of a new 92 kV transmission line over approximately sixteen (16) miles of an existing 34.5 kV transmission line would use existing access and ~~re~~disturb a maximum of approximately 21 acres, some of which would be redisturbance of previously disturbed areas~~, but would not create any new surface disturbance~~.

Figure S-1: Imperial Project General Location Map

Figure S-2: Imperial Project Vicinity Map

Figure S-3: Imperial Project Mine and Process Area Facilities

Mining of the pits would be phased, and would consist of drilling, blasting, loading and hauling. Ore would be hauled, without crushing, to the heap leach pad to be leached of the precious metals with a dilute solution of sodium cyanide. The heap leach pad would be lined with synthetic materials as an engineered zero-discharge facility with leak detection systems, in conformance with the requirements of the California Regional Water Quality Control Board, Colorado River Basin Region. The leached precious metals would be recovered from the cyanide solution in the process plant, and shipped offsite as gold doré. Waste rock would be placed on waste rock stockpiles located adjacent to the pits, or into previously mined-out open pits. The West Pit would be the first pit mined and would be entirely backfilled under the Proposed Action.

Up to four (4) ground water production wells would be drilled and completed to provide the Project peak water requirements of approximately 1,000 gallons per minute (gpm) and 1,200 acre feet per year (afy). These wells would be drilled adjacent to a 1.5-mile section of Indian Pass Road outside of the Project mine and process area. The produced water would be pumped to the Project mine and process area via an underground pipeline.

Peak Project electrical demand of up to eight (8) MW would be ~~purchased~~ provided from ~~a local~~ the utility grid. This would require the "overbuilding" of an existing Imperial Irrigation District (IID) 34.5 kV transmission line for approximately sixteen (16) miles from Interstate 8 near Sidewinder Road to Indian Pass Road near Ogilby Road with a new 92 kV transmission line also owned by the IID (Figure S-2). At that point a new metering station and a new 92 kV transmission line, both proposed to be owned by the Project, would be constructed adjacent to Indian Pass Road for approximately 4.5 miles to a mine substation within the Project mine and process area ~~(Figure S-2)~~. A new 7.2 kV distribution line would also be built on the same transmission line poles under the new 92 kV transmission line from the Project mine and process area to provide power to the Project ground water well pumps located along Indian Pass Road. A 500 kW± diesel-powered emergency electric generator would be located in the Project mine and process area.

An approximately 6,000-foot section of Indian Pass Road would be realigned approximately 1,000 feet to the west of the Project mine and process area prior to mining the West Pit (Figure S-3), and the intersection of Indian Pass Road with Ogilby Road would be realigned. Several ephemeral drainages would be temporarily and/or permanently diverted around Project facilities within the Project mine and process area, although all diversions would return the diverted water to the same major ephemeral drainage system.

Reclamation activities would be conducted in accordance with SMARA and the regulations found at 43 CFR 3809.1-3(d) and 14 CCR 3500. The proposed Reclamation Plan includes measures for: protecting wildlife and the public; minimizing erosion and mass failure potential; demolishing structures and neutralizing process components; regrading

selected side and cut-and-fill slopes; revegetating; and, where feasible, providing for the resumption of pre-mining land uses. Figure S-4 shows the projected final configuration of the East Pit and the backfilled West Pit subsequent to the completion of mining and placement of waste rock but prior to the commencement of final reclamation.

Approximately 100 workers may be required to construct the Project facilities, although only a portion of these workers would be at the Project site at any given time. Approximately 150 workers would be employed to operate the Project. Project traffic on Ogilby Road and Indian Pass Road is estimated at approximately 47 lightweight vehicle round trips, and 3.5 heavy truck round trips, per day. The Project would generate approximately $68 million in annual expenditures for payroll, taxes, and local purchases in 1997.

REDUCED PROJECT ALTERNATIVE

The Reduced Project Alternative would reduce the scope of the Project by mining only the West Pit and Singer Pit, including portions of the Mineralized Potential Area, and the accompanying construction of the necessary heap leach pad and waste rock stockpile(s) with appropriate capacities (see Figure S-5). The Reduced Project Alternative would decrease the total tons of ore and waste rock to be mined to approximately 270 million tons, approximately 45 percent of that mined by the Proposed Action. The total estimated surface area disturbed by the Reduced Project Alternative would be approximately ~~861~~ 853 acres, approximately 62 percent of the surface area disturbed by the Proposed Action.

The expected mine life of the Reduced Project Alternative would be approximately ten (10) years. Since the East Pit would not be mined under the Reduced Project Alternative, there would be no waste rock from the East Pit available to completely backfill the West Pit (see Figure S-6).

COMPLETE PIT BACKFILL ALTERNATIVE

The Complete Pit Backfill Alternative consists of the complete filling of all of the open pits with mined material to at least original grade. Subsequent to the completion of mining (as described under the Proposed Action), waste rock would be loaded back into the haul trucks, which would be driven to the edge of the open pit(s) and the waste rock dumped into the pit(s). It would require up to approximately 5.25 years (5 years, 3 months) to move enough waste rock back into the open pits to fill them all to grade once mining was complete, and cost up to approximately $125 million, which exceeds the anticipated return on the Project.

Figure S-4: Imperial Project Mine and Process Area - Projected Final Contours

Figure S-5: Reduced Project Alternative - Mine and Process Area Facility Details

Figure S-6: Reduced Project Alternative - Mine and Process Area Projected Final Contours

Because broken rock occupies a greater volume than the same volume of solid rock, all of the rock mined from an open pit will not fit back into that same pit. A sufficient volume of waste rock would be available to backfill all of the pits, and the spent leached ore, and some waste rock, would remain where originally placed. The Complete Pit Backfill Alternative would not result in any reduction of surface disturbance compared to the Proposed Action since the Complete Pit Backfill Alternative includes completion of the Proposed Action. However, a substantial amount of the surface area disturbed by waste rock stockpiles and the East Pit and Singer Pit would be reclaimed "at grade," and not reclaimed as a stockpile or pit, since the waste rock contents of the stockpile would have been removed and dumped into the open pits (see Figure S-7).

NO ACTION ALTERNATIVE

If the No Action (no project) Alternative is implemented, the Project ~~site~~ area would remain as is, and present uses in the area, including opportunities for dispersed recreational activities, would continue. The ~~site~~ Project area would remain available for future commercial gold processing proposals or for other proposals as permitted by BLM policy or land use designations.

ENVIRONMENTAL CONSEQUENCES, MITIGATION MEASURES, AND SIGNIFICANCE

A summary of the environmental consequences of, mitigation measures for, and level of significance of the environmental consequences before and after mitigation for the Proposed Action and each Alternative identified in this EIS/EIR, are summarized in the following four (4) tables. Detailed discussions of the environmental consequences of, mitigation measures for, and significance before and after mitigation of, the Proposed Action and each of the Alternatives, are provided in Chapter 4 of this EIS/EIR.

Figure S-7: Complete Pit Backfill Alternative - Mine and Process Area Projected Final Contours

Table S-1: Summary of Potential Environmental Effects and Mitigation Measures
Imperial Project - Proposed Action

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
Geology and Mineral Resources:			
• Possible damage to ore heap, waste rock stockpiles, ~~soil stockpile,~~ and pit slopes due to seismic shaking.	S	4.1.1-1: Heap leach pad and waste rock stockpile slopes shall be constructed at overall slopes no steeper than 2H:1V.	NS
		4.1.1-2: Mine pit slopes shall be constructed at overall slopes no steeper than 1H:1.2V (50 degrees) unless mining conditions and geotechnical factors demonstrate through engineering analysis that steeper slopes would be safe, and such steeper slopes shall be approved by the BLM. Slopes shall not be steeper than is safe considering actual rock strength and structural conditions encountered.	
		4.1.1-3: Approximately 40-foot wide benches ~~Benches~~ shall be constructed at approximately 80-foot high ~~appropriate~~ intervals on mine pit slopes to catch loose rocks. Approval shall be obtained from the BLM prior to construction of mine pit benches which differ substantially from these specifications.	
		4.1.1-4: Project structures subject to the Uniform Building Code shall be designed and constructed consistent with the standards of Seismic Zone 4.	
		4.1.1-~~4~~5: To avoid any significant slumping or slope failure of the waste rock stockpile slopes, a slope stability analysis of the proposed waste rock stockpile slope configurations shall be conducted prior to the placement of waste rock on the stockpile, and the results of any study should be followed during the construction of the waste rock stockpile.	
Soil Resources:			
• Mine construction will result in the loss of ~~shallow surface~~ soils from the Project area.	S	4.1.2-1: Surface disturbance shall be kept to the minimum that is required to construct and operate the project.	NS
		4.1.2-2: Soils shall be salvaged from all areas where sufficient soil development is noted in conformance with the approved Reclamation Plan. Soils shall be salvaged to the greatest depth practicable and placed in stockpiles clearly delineated with signs to assure the material is not mistaken as waste rock.	
• Diversion of drainage channels and construction of the ore heap, waste rock stockpiles, soil stockpiles, and pits could result in accelerated soil erosion within the Project area.	S	4.1.2-3: All mine facilities shall be designed and constructed with erosion control features engineered to meet the performance standards ~~at~~ of 14 CCR 3706, including the control of runoff and protection of areas susceptible to erosion from surface flows.	NS
		4.1.2-4: A Storm Water Pollution Prevention Plan (SWPPP), incorporating the use of Best Management Practices for erosion control, shall be developed and implemented in accordance with the California Storm Water NPDES permit program.	

S = Significant
NS = Not Significant
SU = Significant Unavoidable
SC = Significant Cumulative
B = Beneficial
* = Cannot be Determined at This Time

Table S-1: Summary of Potential Environmental Effects and Mitigation Measures
Imperial Project - Proposed Action

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
Hydrology (Surface Water):			
• The diversion of drainage channels within the Project area could result in adverse streamflow consequences with respect to bank erosion, loss of surface water from existing drainages, and potential for flooding.	S	4.1.3.1-1: Major watercourses shall be diverted only to the extent necessary to protect Project facilities, and shall be diverted back into the same wash system after as short a diversion as practical. Permanent diversion channels shall be built to approximate the original drainage system in both gradient and channel geometry, and ~~Appropriate energy dissipators shall be constructed at the point of discharge into the pre-existing watercourses, and along banks subject to high erosion potential (such as the outside banks of turns) to minimize the potential for erosion. Diversion channels~~ shall be engineered to adequately contain and deliver stream flows resulting from the 100-year/24-hour precipitation event.	NS
• Potential hydrologic runoff containing contaminants from the ore heap, waste rock or soil stockpiles, or from surface facilities could enter the drainage channels and adversely affect water quality.	S	4.1.3.1-2: All chemicals shall be stored in conformance with applicable local, state and federal regulations. All non-mining wastes shall be stored in secondary containment area and disposed of offsite in an approved landfill. Regulated wastes shall be recycled or disposed of in conformance with all applicable local, state and federal laws and regulations, and in a manner approved by the responsible regulatory agencies. 4.1.3.1-3: Major maintenance of equipment shall be conducted within the concrete-paved and bermed areas of the maintenance yard to the extent possible to minimize accidental discharges of waste lubricants and other materials to the ground. 4.1.3.1-4: Each phase of the heap leach pad system (heap, pad, ponds, etc.) shall be designed to provide for 100-percent containment of the precipitation from the maximum probable one (1)-hour storm event occurring simultaneously with a 24-hour power outage while still maintaining a two-foot freeboard in the process and overflow ponds, or consistent with the requirements of the CRWQCB. 4.1.3.1-5: Sufficient protective measures, such as set-backs or rip rap, shall be designed and employed to ensure that the pregnant, barren, and overflow ponds will not be exposed to erosion or overtopping by storm flows in the natural watercourse located immediately to the east.	NS

S = Significant
NS = Not Significant
SU = Significant Unavoidable
SC = Significant Cumulative
B = Beneficial
* = Cannot be Determined at This Time

Table S-1: Summary of Potential Environmental Effects and Mitigation Measures
Imperial Project - Proposed Action

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
Hydrology (Ground Water):			
• Excessively high pumping rates from individual ground water production wells could result in damage to the aquifer and well bore.	NS	4.1.3.2-1: To prevent excessive drawdown or possible damage to the well or pumping system, ground ~~Ground~~ water production from well PW-1 shall be limited to a maximum average of 550 gpm unless a higher pumping rate, supported by reasonable proof of increased well efficiency, is approved by the ICPBD. The maximum average production rate from each additional production well drilled shall be limited to that rate which prevents excessive drawdown or possible damage to the well or pumping system. 4.1.3.2-3: The total maximum production rate from all of the ground water production wells shall not exceed 1,000 gpm, and the total annual ground water production rate shall not exceed 1,200 afy.	NS
• Cross-contamination of ground water aquifers could result if ground water wells are not properly abandoned.	NS	4.1.3.2-2: Ground water production and monitoring wells shall be plugged and abandoned in conformance with applicable regulatory requirements, including 14 CCR 3713(a).	NS
• Inadequate liner design or installation or, or long-term leaks in heap leach pad~~,~~ could allow aqueous contaminants from the ore heap to migrate from the surface through the soil to ground water beneath the Project mine and process area.	S	4.1.3.2-~~3~~4: The heap leach pad shall be designed, constructed and operated in conformance with the specifications, requirements and prohibitions of Waste Discharge Requirements issued by the CRWQCB. 4.1.3.2-~~4~~5: The heap leach pad shall be monitored in conformance with the requirements of the Monitoring and Reporting Program issued by the CRWQCB.	NS

GW monitoring plan —

S = Significant
NS = Not Significant

SU = Significant Unavoidable
SC = Significant Cumulative

B = Beneficial
* = Cannot be Determined at This Time

Table S-1: Summary of Potential Environmental Effects and Mitigation Measures
Imperial Project - Proposed Action

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
Air Resources:			
• Implementation of the Proposed Action will result in the emission of significant quantities of fugitive PM_{10}.	S	4.1.4-1: Water sprays, chemical treatments acceptable to the BLM, or other RACM determined acceptable by the ICAPCD shall be applied to the haul and maintenance roads within the Project mine and process area to minimize the generation of fugitive PM_{10}. If water sprays are used, they shall be applied no less than once per day on days without precipitation unless road surface moisture is documented as sufficient to suppress fugitive dust emissions without additional water. 4.1.4-2: Project employees, contractors, and visitors shall be advised of the need to adhere to speed limits to minimize the generation of fugitive dust. 4.1.4-3: Shrouding of the lime discharge to the ore trucks and prompt revegetation of the soil stockpiles, or equivalent RACM for these fugitive PM_{10} emissions, shall be implemented and maintained. 4.1.4-4: Water sprays or chemical treatments acceptable to the ICPWD shall be applied to Indian Pass Road from its intersection with Ogilby Road to the boundary of the Project mine and process area with sufficient frequency to minimize the emissions of fugitive PM_{10} from Project traffic on Indian Pass Road. 4.1.4-~~4~~5: All permits required by the ICAPCD shall be obtained, and all operations conducted in general compliance with the conditions of these permits. 4.1.4-~~5~~6: All disturbed surfaces no longer needed for project activities shall be reclaimed as soon as practical to minimize fugitive PM_{10} emissions from wind erosion.	NS

S = Significant
NS = Not Significant

SU = Significant Unavoidable
SC = Significant Cumulative

B = Beneficial
* = Cannot be Determined at This Time

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
Biological Resources:			
• Wildlife could enter the Project mine and process area and be endangered by mine activities or potentially harmful materials stored at the mine.	S	4.1.5-1: Applicant shall construct a fence ~~no less than four (4) feet in height~~ around the entire Project mine and process area. The fence shall be constructed no less than four (4) feet in height with 3-strands of smooth wire, or equivalent~~, and shall include tortoise exclusion fencing, in conformance with responsible agency requirements, to inhibit wildlife access to Project facilities~~. That portion of the perimeter fence constructed along the western boundary of the Project mine and process area, including all of the fenceline adjacent to Indian Pass Road (see Figure 2-2), shall be a chain-link fence, no less than six (6) feet in height, to restrict public access to the Project area. The entire perimeter fence shall include desert tortoise exclusion fencing, in conformance with responsible agency requirements, to inhibit wildlife access to Project facilities (see also Mitigation Measure ~~4.1.5-40~~ 4.1.5-38). Applicant shall ~~also~~ construct ~~an interior~~ a chain-link fence, no less than six (6) feet in height, with one (1) foot of barbed wire at the top, around the ore leach pad, process facilities, and fresh water pond to further restrict wildlife from accessing these facilities. Applicant shall routinely inspect and repair the fences, as necessary. 4.1.5-3: Applicant shall cover the pregnant and barren solution ponds with either small-mesh nets; a solid, 40-mil, HDPE/polypropylene cover; floating plastic balls; or equivalent cover acceptable to the BLM to keep wildlife out of the ponds. Applicant shall maintain the cover over the life of the Project. Applicant shall keep records of all wildlife kills which may be associated with the use of cyanide by the project, including all dead wildlife found in or adjacent to the ponds or heap. Observations of wildlife killed in the ponds or on the heap shall be reported to the BLM, CDFG, and the U.S. Fish and Wildlife Service (USFWS) ~~quarterly~~ monthly for evaluation and, if determined necessary, for possible imposition of additional mitigation requirements (see also Mitigation Measure 4.1.5-34)	NS
• The Project could introduce or allow noxious weeds or plants to invade the Project area.	S	4.1.5-20: Applicant shall implement ~~a weed abatement program over the life of the Project for control of salt cedars (*Tamarisk sp.*) and other potentially noxious weeds that may invade the site. The weed abatement program shall include ordinary practices such as seasonal grubbing and the application of herbicides, as necessary.~~ weed control measures such that all introduced plants (e.g., salt cedar (*tamarisk species*), mustard, and other noxious weeds) will not become established within the Project area. Manual or mechanical means of control will be the preferred methods employed. Use of other methods (e.g., herbicides) will require approval by the BLM. The weed control measures shall be implemented when noxious weeds are visually identified on the site and shall continue over the life of the Project.	NS

S = Significant
NS = Not Significant
SU = Significant Unavoidable
SC = Significant Cumulative
B = Beneficial
* = Cannot be Determined at This Time

Table S-1: Summary of Potential Environmental Effects and Mitigation Measures
Imperial Project - Proposed Action

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
• The Project would result in the loss of approximately 100 acres of microphyll woodland habitat over the active life of the Project and a net loss of about 50 acres of microphyll woodland habitat post-Project.	S	4.1.5-7: Applicant shall construct a fence~~ generally equivalent to the Project perimeter fence entirely~~, no less than four (4) feet in height with 3-strands of smooth wire, or equivalent, around the approximately 40-acre south-central portion of the central wash within the Project mine and process area which is not intended to be disturbed by Project operations to prevent accidental surface disturbance of the microphyll woodland habitat in this internal area during mine construction and operation. 4.1.5-8: Applicant shall provide periodic drip irrigation over the life of the Project to enhance the establishment of ironwood and deer browse vegetation within the surface drainage identified by Mitigation Measure 4.1.5-7~~, as may be appropriate, to enhance the quality of microphyll woodland habitat in this drainage~~. Vegetation selected for enhanced deer browse establishment shall be comprised of species known to occur in the Project area. The composition of the seed mix and the design of the vegetation enhancement measures shall be submitted to the BLM for approval prior to implementation. 4.1.5-9: Applicant shall construct a big game guzzler in a design and location acceptable to the BLM and the CDFG in the general vicinity of the Project mine and process area to ~~mitigate the loss of~~ provide for more intensive use of the existing habitat ~~for~~ by deer and other wildlife. Applicant shall obtain the required permit from the BLM prior to guzzler construction. 4.1.5-10: Applicant shall provide periodic drip irrigation over the life of the Project to enhance the establishment of ironwood and deer browse vegetation along the western slopes and banks of the approximately 3,000-foot section of the existing ephemeral stream channel immediately adjacent to, but outside of, the east-southeast boundary of the Project mine and process area~~ as may be appropriate to enhance the quality of existing microphyll vegetation and available deer browse on this area of this channel~~. Vegetation selected for enhanced deer browse establishment shall be comprised of species known to occur in the Project area. The composition of the seed mix and the design of the vegetation enhancement measures shall be submitted to the BLM for approval prior to implementation. 4.1.5-11: Applicant shall conduct annual transect surveys of the major through-going ephemeral stream channels upstream and downstream of the Project mine and process area to monitor these drainages with respect to existing vegetation and microphyll woodland habitat and document any potentially adverse erosional or depositional processes. The surveys shall also document any sightings of deer fawn, bighorn sheep~~ and any~~, mountain lion, or other species for which monitoring is specified by the BLM. An annual report of the transect surveys shall be prepared and submitted in an acceptable form to the BLM.	NS

S = Significant
NS = Not Significant
SU = Significant Unavoidable
SC = Significant Cumulative
B = Beneficial
* = Cannot be Determined at This Time

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation

4.1.5-12: Applicant shall construct all stream channel diversions to divert flows back into the same major wash system and ensure the continuing flow of an equivalent pre- and post-Project quantity and quality of water through the major drainages to preserve the downstream microphyll woodland habitat within the drainages (see also Mitigation Measure ~~4.1.5-34~~4.1.5-33 and mitigation measures provided for surface hydrology [Section 4.1.3.1.3]). ~~Upon the completion of the backfilling of the West Pit, Applicant shall replace the diverted section of the major western stream channel to its approximate original location within the Project mine and process area.~~

4.1.5-15 Applicant shall enter into a Stream Alteration Agreement with the California Department of Fish and Game (CDFG) as may be required pursuant to California Fish and Game Code Section 1603 ~~(see also Mitigation Measure 4.1.5-7)~~. The agreement shall include those measures which CDFG and Applicant agree may be necessary, or appropriate, to mitigate, and compensate for, the impacts of the Project on the stream channels and associated microphyll woodland habitat and wildlife. Measures which may be included in the Stream Alteration Agreement include:

(1) Applicant shall acquire title to offsite private lands with comparable microphyll woodland habitat, in a location acceptable to the CDFG and the Applicant, to compensate at a 1:1 ratio for microphyll woodland destroyed and not reclaimed as a result of the Project. Ownership of the acquired land shall be transferred to the CDFG for long term habitat management.

(2) Applicant shall construct and/or maintain over the life of the Project one or more additional big game and/or small game guzzlers in a design and location acceptable to the CDFG, Applicant, and BLM, as appropriate, to enhance the habitat for deer and other wildlife.

(3) Applicant shall perform reclamation activities on one or more offsite locations on land in the vicinity of the Project acceptable to CDFG, Applicant, and the BLM, as appropriate, to restore microphyll woodland habitat which has been adversely impacted by previous actions unrelated to the Project.

(4) Applicant shall either fund or conduct additional biological investigation(s) as may be acceptable to the CDFG and Applicant to develop additional data for future agency decisions reflecting the biological resources associated with stream channels in the general vicinity of the Project.

S = Significant
NS = Not Significant
SU = Significant Unavoidable
SC = Significant Cumulative
B = Beneficial
* = Cannot be Determined at This Time

Table S-1: Summary of Potential Environmental Effects and Mitigation Measures
Imperial Project - Proposed Action

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
• The Project could adversely affect listed and sensitive plant and wildlife species.	S	4.1.5-4: Applicant shall advise Project employees, contractors, and visitors of the need to adhere to speed limits and to avoid any animals, including the desert tortoise, flat-tailed horned lizard, and deer which may be encountered on or crossing the road to and from the Project area. 4.1.5-26: Applicant shall designate a field contact representative (FCR) who will be responsible for overseeing compliance with protective stipulations for listed species. The FCR shall have authority to halt all activities that are in violation of the stipulations. The FCR shall have a copy of all appropriate stipulations when work is being conducted at the site. The FCR may be a project manager, company environmental coordinator, contract biologist, or~~ a person designated by the agencies.~~ other person identified as responsible by the Applicant. Applicant shall provide the name and contact information of the FCR to the BLM and applicable responsible agencies prior to site construction. 4.1.5-27: Prior to the onset of surface disturbance activities by the Project, Applicant shall retain qualified biologist(s) acceptable to the BLM and the CDFG to inspect the Project mine and process area and capture and relocate any chuckwallas encountered to suitable microhabitat (e.g., rock rubble, rock outcrop~~ and~~, exfoliating cracks or crevice areas) in the shortest distance possible between the outside of the Project mine and process area perimeter fence (not to exceed 1,000 feet) and the point of capture~~ within 1,000 feet outside of the Project mine and process area perimeter fence~~. 4.1.5-28: During mining activities, stockpiling of equipment and vehicles shall utilize those portions of the Project area that will be subject to permanent disturbance. Temporary or inadvertent disturbance to remaining portions of the area should be minimized by: staking, "flagging", or otherwise clearly marking the boundaries of the alignment; notifying employees of the specific areas, boundaries of the areas, and the need to avoid disturbance to remaining areas; and posting signs or erecting temporary fencing at access points to limit access to authorized vehicles and equipment only. All employees shall be instructed that their activities shall be confined to locations within flagged or otherwise marked areas. The area of disturbance shall be confined to the smallest practical area, considering extent and location of ore bodies, topography, placement of facilities and access roads, locations of sensitive species, public health and safety, and other limiting factors. To the extent practical, previously disturbed areas within the Project ~~site~~ mine and process area shall be used for the placement of equipment, work staging sites, or parking of vehicles.	NS

S = Significant
NS = Not Significant

SU = Significant Unavoidable
SC = Significant Cumulative

B = Beneficial
* = Cannot be Determined at This Time

Table S-1: Summary of Potential Environmental Effects and Mitigation Measures
Imperial Project - Proposed Action

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
		4.1.5-29: Open pipeline trenches, test holes, or test trenches shall be regularly inspected by the ~~staff environmental coordinator or a contract biologist at~~ FCR, or qualified biologist acceptable to the BLM, a minimum of three (3) times per day. During excavation of trenches or holes, escape ramps consisting of loose earth deposited in the test hole or trench shall be placed to facilitate the escape of any wildlife species that may inadvertently become entrapped. Any animals discovered shall either be allowed to escape before activities resume or carefully removed from the pit or trench and allowed to escape. A final inspection of the open trench segment or hole shall also be made by ~~a qualified biologist~~ the FCR, or qualified biologist acceptable to the BLM, immediately prior to backfilling. Arrangements shall be made prior to the onset of maintenance or construction to ensure that listed wildlife species can be removed from the trench without violating any requirements of the federal or California Occupational Safety and Health Administration.	
		~~4.1.5-30: To prevent the creation of on-site colonies of California leaf-nosed bats or other sensitive bat species during active mining operations, and as a means of reducing the site "attractiveness" as a roosting area for these species, Applicant shall screen the openings of any shafts or tunnels constructed on the site during mining operations.~~	
		~~4.1.5-31:~~4.1.5-30: Toxic materials contained on the site shall be stored and used in a manner that prevents harm to desert tortoises and other wildlife species. Methods of containment will be approved by the BLM.	
		~~4.1.5-32:~~4.1.5-31: Nets or other suitable coverings shall be placed over all ponds containing toxic solutions to prevent contact by area wildlife species, including bats. These coverings shall be regularly inspected and maintained by Applicant for the duration of the Project. Methods of cover, inspection, and maintenance will be approved by the BLM.	
		~~4.1.5-33:~~4.1.5-32: Transmission pole design shall prevent any potential for the inadvertent electrocution of raptors (see also Mitigation Measure ~~4.1.5-45~~4.1.5-43). Transmission pole design will be approved by the BLM.	

S ≡ Significant
NS ≡ Not Significant
SU ≡ Significant Unavoidable
SC ≡ Significant Cumulative
B ≡ Beneficial
* ≡ Cannot be Determined at This Time

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
		~~4.1.5-35:~~4.1.5-34: Project employees involved with regular activities shall be required to take a threatened and endangered species education program. The program shall include information on the biology of listed and sensitive species and their occurrence in the Project area, measures being implemented for the protection of ~~this species~~ desert tortoise and its habitats during Project activities~~;~~ and means by which individual employees can facilitate this process. A program approved by BLM shall be employed. Wallet-size cards signifying completion of training shall be recommended to employees. All employees shall participate in the education program prior to commencing Project activities. New employees shall receive formal approved training prior to working on-site. The program shall typically last from between 30 minutes and one (1) hour and shall cover the following topics at a minimum: • Distribution; • General behavior and ecology; • Sensitivity to human activities; • Legal protection; • Penalties for violation of State and federal laws; • Reporting requirements; and • Project mitigation measures.	

Table S-1: Summary of Potential Environmental Effects and Mitigation Measures
Imperial Project - Proposed Action

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
• The Project would result in the "take" of the federal- and state-listed desert tortoise.	S	4.1.5-23: Applicant shall comply with ~~the applicable provisions of the Federal Endangered Species Act of 1973, California Endangered Species Act of 1984, Native Plant Protection Act of 1977, Migratory Bird Treaty Act, and the Bald Eagle Protection Act.~~ all of the terms and conditions of the Biological Opinion prepared for the Project by the U.S. Fish and Wildlife Service in response to the BLM request for formal consultation pursuant to Section 7 of the Endangered Species Act of 1973, as amended. ~~4.1.5-36:~~4.1.5-35 Incidences of observations of desert tortoises and their sign during activities shall be conveyed to the ~~Project field supervisor~~ FCR during mining actions. Employees shall be notified that they are not authorized to handle or otherwise move any desert tortoises encountered. ~~4.1.5-37:~~4.1.5-36: Tortoises commonly seek shade during the hot portions of the day. During mine project activities, employees shall be required to check under equipment and vehicles prior to moving such. If tortoises are encountered, the vehicle shall not be moved until such animals have voluntarily moved to a safe distance away from the parked vehicle. ~~4.1.5-38: Mining employees shall exercise caution when commuting to the Project area. Speed limits shall be limited to the speed designated by the Imperial County Road Department to minimize the chance for the inadvertent injury or mortality to desert tortoises or other wildlife species encountered on the road. Subject to County approval and BLM concurrence, Applicant shall post speed limit signs along Indian Pass Road.~~	NS

S = Significant
NS = Not Significant
SU = Significant Unavoidable
SC = Significant Cumulative
B = Beneficial
* = Cannot be Determined at This Time

Table S-1: Summary of Potential Environmental Effects and Mitigation Measures
Imperial Project - Proposed Action

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation

~~4.1.5-39:~~4.1.5-37: If desert tortoises must be moved from harm's way during any Project activities, the following procedures shall be implemented by persons authorized by the USFWS to handle desert tortoises:

(1) Desert tortoises shall be handled only by an authorized tortoise handler and only when necessary. New latex gloves shall be used when handling each desert tortoise to avoid the transfer of infectious diseases between animals. Desert tortoises shall be moved the minimum distance possible within appropriate habitat to ensure their safety. In general, desert tortoises shall not be moved in excess of 1,000 feet for adults and 300 feet for hatchlings. An authorized tortoise handler should follow the general handling methods contained in the "Protocols for Handling Live Tortoises" (~~Arizona Game and Fish, *et al*, 1991~~USFWS, 1990).

(2) Desert tortoises that are found above ground and need to be moved from harm's way shall be placed in the shade of a shrub. All desert tortoises removed from burrows shall be placed in an unoccupied burrow of approximately the same size as the one from which it was removed. All excavation of desert tortoise burrows shall be done using hand tools, either by or under the direct supervision of an authorized tortoise handler. If an existing burrow is unavailable, an authorized tortoise handler shall construct or direct the construction of a burrow of similar shape, size, depth, and orientation as the original burrow. Desert tortoises moved during inactive periods shall be monitored for at least two days after placement in the new burrows to ensure their safety. An authorized tortoise handler shall be allowed some judgement and discretion to ensure that survival of the desert tortoise is likely.

(3) If desert tortoises need to be moved at a time of the day when ambient temperatures could harm them (less than 40 degrees F or greater than 90 degrees F), they shall be held overnight in a clean cardboard box. These desert tortoises should be kept in the care of an authorized tortoise handler under appropriate controlled temperatures and released the following day when temperatures are favorable. All cardboard boxes shall be appropriately discarded after one use.

(4) All desert tortoises moved from harm's way shall be marked for future identification. An identification number using the acrylic paint/epoxy covering technique should be placed on the fourth costal scute (USFWS, 1990). No notching should be authorized.

To facilitate clearing the area of desert tortoises, excavation of burrows should begin no more than fourteen (14) days prior to the onset of surface disturbing activities, as long as a final survey is conducted within 24 hours of the onset of activities to ensure that desert tortoises have not returned to the work area.

S = Significant
NS = Not Significant
SU = Significant Unavoidable
SC = Significant Cumulative
B = Beneficial
* = Cannot be Determined at This Time

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
		~~4.1.5-40:~~4.1.5-38: In order to minimize any exposure risk to desert tortoises, a specially designed fence shall be constructed around all portions of the Project area containing pits, ponds, waste rock stockpiles, ore processing areas, maintenance areas, and surface facilities. ~~Fence~~ The final fence design shall be discussed with and found acceptable to the USFWS, BLM, and CDFG. The desert tortoise exclusion fence must meet the following preliminary design specifications: (1) Fencing shall result in a non-breachable barrier, and its support structure may be comprised of a variety of materials; (2) Galvanized ¼- to ½-inch diameter mesh and 36-inch wide hardware cloth shall be used; and (3) The hardware cloth shall be buried 12 inches underground, extend at least 24 inches above the ground, and be firmly attached to the bottom of the perimeter fence and other wildlife exclusion fences. ~~4.1.5-41:~~4.1.5-39: Following fence installation, and prior to initiation of mining, authorized biologists shall conduct a complete (i.e., 100%) survey for desert tortoises within the fenced area. All tortoises found shall be marked and removed from the fenced mine area for safe offsite release within 1,000 feet of the outside of the Project fence using protocols acceptable to the BLM, USFWS, and the CDFG. ~~4.1.5-42:~~4.1.5-40: At the conclusion of Project pre-activity surveys and the relocation of any desert tortoises outside of the Project fence, Applicant and an authorized tortoise handler shall prepare a summary report documenting the desert tortoise protection measures implemented. The summary report shall be submitted to the BLM. ~~4.1.5-43:~~4.1.5-41: Pipeline placement design outside of tortoise-proof fenced project boundaries shall allow for the unimpeded movement of tortoises and other small terrestrial wildlife species. ~~4.1.5-44:~~4.1.5-42: That portion of the transmission line corridor extending outside of the fenced Project mine and process area boundary shall be re-surveyed for desert tortoise burrows and pallets within fourteen (14) days preceding line upgrading/construction. Tortoise burrows and pallets encountered within the construction zone (if any) shall be conspicuously flagged by the surveying biologist(s) and avoided during power pole placement or existing line upgrading. Contingent upon the findings of the pre-survey for the transmission line upgrade/construction, a determination will be made by the BLM as to whether or not on-site desert tortoise monitoring will be required during the transmission line upgrade/construction activities.	

S = Significant
NS = Not Significant
SU = Significant Unavoidable
SC = Significant Cumulative
B = Beneficial
* = Cannot be Determined at This Time

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
		~~4.1.5-45:~~4.1.5-43: Transmission pole design shall prevent any nesting or perching by ravens, a major predator of young desert tortoises (see also Mitigation Measure ~~4.1.5-33~~4.1.5-32). ~~4.1.5-46:~~4.1.5-44: Notification signs for the desert tortoise and speed limit signs shall be placed and maintained within the Project boundary by Applicant to reduce chances for inadvertent vehicle-induced injury or mortality to desert tortoises and other wildlife species. Applicant, with concurrence of County, shall also place these signs along Indian Pass Road leading to the Project mine and process area. ~~4.1.5-47:~~4.1.5-45: Applicant shall participate in the BLM desert tortoise program for acquiring offsetting lands in compensation for adverse modification of desert tortoise habitat. Under the BLM policy undesignated lands such as the Project area, where tortoises or tortoise sign are located, become Class III tortoise habitat. Within Class III habitat, an offsetting ratio of 1:1 (e.g., one (1) acre of land secured and protectively managed for each acre affected) is applied. Prior to the Record of Decision, Applicant shall determine the feasibility of acquiring 200 acres of suitable desert tortoise habitat which is also microphyll woodland habitat. This 200 acres of desert tortoise/microphyll woodland habitat should be in a location, and of a quality, acceptable to the BLM to concurrently provide mitigation for the loss of desert tortoise and microphyll woodland habitat from the Project area.	

S = Significant
NS = Not Significant
SU = Significant Unavoidable
SC = Significant Cumulative
B = Beneficial
* = Cannot be Determined at This Time

Table S-1: Summary of Potential Environmental Effects and Mitigation Measures
Imperial Project - Proposed Action

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
• The Project will destroy vegetation and wildlife habitat within the Project area.	S	4.1.5-13: Applicant shall implement the ~~site~~ Project Reclamation Plan in conformance with the requirements of the BLM and Imperial County. The Reclamation Plan shall include a program for revegetation of the permanent diversion channels, including the planting of seedlings ~~or~~ of young ironwood and palo verde and seeding of other microphyll vegetation typical of the pre-Project wash habitat (see also Mitigation Measure 4.1.5-17). 4.1.5-14 Applicant shall, as a part of final reclamation, construct one or more big game and/or small game guzzlers within the Project mine and process area in a design and location acceptable to the BLM and the CDFG to enhance the restored site as habitat for deer and other wildlife. Applicant shall obtain the required permit from the BLM prior to guzzler construction. 4.1.5-17: The ~~site~~ Project Reclamation Plan shall include the collection of both fairy duster seeds and winged ~~forget-me-not~~ cryptantha seeds and distribution of the collected seeds of both species within appropriate microhabitats within the Project mine and process area. 4.1.5-18: Applicant shall stockpile available soil from the wash channels to be disturbed within the Project mine and process area and store the soil for subsequent use during site reclamation activities. 4.1.5-19: Applicant shall salvage specimens of selected plant species from the Project mine and process area prior to construction to be utilized during Project reclamation, habitat enhancement activities, or other site reclamation needs. Plant species may include cactus, ocotillo, ironwood, palo verde, or other appropriate species identified by the BLM. 4.1.5-21: Applicant shall implement the revegetation program contained in the ~~site~~ Project Reclamation Plan approved by the BLM and Imperial County. The revegetation program shall include a test plot program, surface contouring and shaping, salvage and distribution of stockpiled soils, collection of a seedbank of seeds from within and in the vicinity of the Project area, preparation of seedbeds, seeding with approved mixtures of native plant species endemic to the area, planting of the plants salvaged from the area prior to mine construction, monitoring for invasion of noxious weeds or salt cedar, and vegetation success monitoring. 4.1.5-22: Applicant shall integrate the revegetation program activities with other site stabilization and restoration activities required by the approved ~~site~~-Reclamation Plan (see also Mitigation Measures 4.1.5-12 and 4.1.5-13).	NS

S = Significant
NS = Not Significant

SU = Significant Unavoidable
SC = Significant Cumulative

B = Beneficial
* = Cannot be Determined at This Time

Table S-1: Summary of Potential Environmental Effects and Mitigation Measures
Imperial Project - Proposed Action

	Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
•	Mine construction and operations could adversely impact vegetation and wildlife dependent on the ephemeral drainage channels which course through the Project area.	S	4.1.5-24: Project actions may also require a dredge and fill permit (404 permit) from the U.S. Army Corps of Engineers (ACOE). A permit is required in the event that proposed activities would entail the dredging or filling of materials into designated waters of the United States. The ACOE shall be contacted by Applicant to determine whether such a permit shall be required prior to the onset of any actions that would disturb site drainages.	NS
			4.1.5-25: The California Regional Water Quality Control Board, Colorado River Basin Region (CRWQCB) shall be notified by the Applicant of Project actions, and Applicant shall comply with CRWQCB requirements for obtaining Waste Discharge Requirements for proposed discharges to land and a general Storm Water Permit.	
			~~4.1.5-34:~~4.1.5-33: Project actions will require the realignment of sections of washes. Applicant shall develop a specific plan for agency approval that ensures maintenance of intermittent flood water flow down these realigned wash channels into unmodified drainage boundaries outside of the Project in order to preserve vegetation and wildlife habitat. Design of these sections of realigned wash shall also include appropriate dimensions and slopes to accommodate continued use by wildlife during mining operations and to facilitate revegetation. A specific plan shall be prepared by Applicant and submitted to the BLM for review prior to the onset of any activities that would result in disturbance to these drainages. Plan design shall include the vegetation of channel bypasses on the site with native species that include ironwood and palo verde in order to maintain continuity of washes, restoration and revegetation of drainages during site reclamation, and planting of ironwoods and palo verde in offsite drainages to enhance wildlife habitat. Any rip rap initially placed along drainages during mining activities shall be removed at the conclusion of mining operations during on-site reclamation.	
•	The Project could indirectly impact vegetation and wildlife habitat outside the boundaries of the Project area.	NS	4.1.5-2: Applicant shall prohibit cross-country use of vehicles and equipment except within those portions of the mine and process area subject to surface disturbance.	NS
			~~4.1.5-49:~~4.1.5-47: Firearms and pet dogs shall be prohibited from the mine site.	
•	Trash and food scraps generated by the Project could attract additional predators to the Project vicinity.	NS	~~4.1.5-48:~~4.1.5-46: Trash and food items shall be contained in closed containers ~~and removed regularly from the mining site in order~~ to reduce attractiveness to opportunistic predators such as ravens, coyotes, and kit foxes.	NS

S = Significant
NS = Not Significant
SU = Significant Unavoidable
SC = Significant Cumulative
B = Beneficial
* = Cannot be Determined at This Time

Table S-1: Summary of Potential Environmental Effects and Mitigation Measures
Imperial Project - Proposed Action

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
• Adverse conditions left at the end of the proposed mining operations could be harmful to wildlife.	NS	4.1.5-5: Prior to completion of mining, Applicant shall conduct an assessment of the potential for a pit lake to form in the East Pit. If the assessment indicates a reasonable potential for a pit lake to form, Applicant shall backfill the East Pit to an elevation which would raise the floor of the pit to an elevation higher than the level of any pit lake which may be predicted to form from the inflow of ground water and, thereby, prevent the creation of an attractive nuisance for wildlife. The findings of the pit lake assessment shall be completed and submitted for approval by the BLM prior to the completion of mining activities. 4.1.5-6: Upon completion of mining activities, either a loose rock rubble barricade comprised of large boulders or other suitable material~~, or an alternative method acceptable to the BLM,~~ shall be constructed to prevent vehicular access and limit pedestrian access to the exposed open pit(s) by the public and terrestrial wildlife species. The proposed design for the barricade shall be completed and submitted for approval by the BLM and ICPBD prior to the completion of mining activities. 4.1.5-16: Upon completion of mining activities, Applicant shall remove all equipment and materials from the Project area. All diversion channel lining materials and rip rap shall be removed from the temporary diversion channels.	NS

S = Significant
NS = Not Significant
SU = Significant Unavoidable
SC = Significant Cumulative
B = Beneficial
* = Cannot be Determined at This Time

Table S-1: Summary of Potential Environmental Effects and Mitigation Measures
Imperial Project - Proposed Action

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
Cultural and Paleontological Resources:			
• Potentially significant prehistoric and historic resources were identified during the intensive Class III pedestrian surveys and cultural resources ~~inventory~~ inventories of the Project area and transmission line. Construction of Project facilities could destroy these, and possibly unidentified, cultural resources within the Project area.	S	4.1.6-1: ~~An intensive Class III pedestrian survey and cultural resources inventory of the area in which the junction of Indian Pass Road with Ogilby Road will be realigned, including sufficient buffer areas, must be completed and submitted to the BLM. No notice to proceed for the construction of this junction realignment will be issued under the right-of-way to be granted for Indian Pass until consultation under Section 106 of the Historic Preservation Act for this area is completed.~~ ~~4.1.6-2:~~ A treatment program to recover the scientific information and qualifying values of each identified cultural resource eligible for the NRHP shall be prepared by qualified parties under contract to the Applicant in consultation with the Quechan Tribe and submitted to the BLM for submittal to SHPO for concurrence. Prior to the start of construction of the Project, the accepted treatment program shall be implemented as necessary for the proposed activities. 4.1.6-~~3~~-2: ~~To the extent feasible,~~ Project components to be located in the Project ancillary area shall be sited to avoid direct or indirect impacts to identified NRHP-eligible cultural resources. Prior to commencement of construction of any Project components in the Project ancillary area, specific plans showing the areas intended for surface disturbance shall be submitted to the BLM and BLM approval obtained. 4.1.6-~~4~~-3: Applicant shall designate a project contact representative (PCR) who will be responsible for overseeing Project compliance with the conditions and stipulations for cultural resources. The PCR shall have authority to halt all activities that are in violation of the stipulations. The PCR may be a project manager, company environmental coordinator, or other person identified as responsible by the Applicant. Applicant shall provide the name and contact information of the PCR to the BLM prior to site construction. Should previously unidentified cultural resources be discovered during project operations, Applicant shall immediately cease operations in the immediate vicinity of the discovery and notify the BLM. Operations shall not be reinitiated in the vicinity of the discovery until authorized by the BLM. 4.1.6-4: To the maximum extent feasible, surface disturbance created during construction of the 92 kV/34.5 kV transmission line shall avoid all direct impacts to all identified potentially NRHP-eligible cultural resources. Fencing and monitoring procedures identified in the cultural resource survey for the transmission line for the prevention of indirect impacts to these resources shall also be implemented, unless otherwise directed by the BLM. A right-of-way for those portions of the 92 kV/34.5 kV transmission line located on public lands shall be obtained from the BLM, and specific plans showing the areas intended for surface disturbance shall be submitted to the BLM and BLM approval obtained prior to commencement of any construction of the 92 kV/34.5 kV transmission line.	~~NS~~*

S = Significant
NS = Not Significant
SU = Significant Unavoidable
SC = Significant Cumulative
B = Beneficial
* = Cannot be Determined at This Time

Table S-1: Summary of Potential Environmental Effects and Mitigation Measures
Imperial Project - Proposed Action

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
Visual Resources:			
• Night lighting of the Project area could interfere with U.S. military flight training exercises conducted in the area.	NS	4.1.7-1: High intensity lighting used for mining and processing operations at night shall be directed downward to reduce fugitive light. Lighting shall have reflectors or shields to further minimize fugitive light. Light stanchions shall be no higher than necessary for safe and efficient lighting. 4.1.7-5: Applicant shall establish a working relationship with the U.S. Marine Corps (USMC) to ensure that nighttime lighting of mine and process areas does not interfere with nighttime overflight operations within flight corridor VFR-299. As part of this mitigation measure, Applicant shall provide the USMC Air Station, Yuma, Arizona, with a detailed, to-scale, map of the Project area identifying the significant surface facilities, transmission lines, and locations of potential light sources to enable the USMC to avoid these areas during their nighttime flight activities.	NS
• Fugitive dust and particulate matter generated during mine construction and operations could impact visibility in the vicinity of the Project area.	S	4.1.7-3: Dust suppressants shall be utilized, as necessary and in accordance with ICAPCD permit requirements, on haul roads to minimize fugitive airborne dust generation on the site.	NS
• Mine construction, operations, facilities, and conditions left at the end of the mining activities would be unattractive and/or conflict with CDCA visual objectives for Class I-II areas.	S	4.1.7-2: Following completion of Project mining activities, all buildings, equipment, supplies, and debris shall be removed to improve the visual appearance of the site. 4.1.7-4: In conformance with the Reclamation Plan approved by the BLM and Imperial County, disturbed areas shall be recontoured and reseeded or revegetated with native or indigenous species complementary to vegetation found in the surrounding area.	SU
Noise:			
• Mine construction, mining operations, and subsequent site reclamation activities would generate noise audible outside the Project area.	NS	4.1.8-1: All heavy equipment, drilling rigs, and other internal combustion engines shall be equipped with mufflers to minimize noise generated during construction, operation and reclamation activities. 4.1.8-3: Applicant shall limit blasting activities to daytime hours to minimize nighttime noise disturbance.	NS
• Blasting and other loud noises generated during the mining activities could endanger worker hearing.	S	4.1.8-2: Applicable Occupational Safety and Health Administration (OSHA) worker noise protection requirements, as set forth in 29 CFR 1910.95, *et seq*, and California Occupational Safety and Health Administration (Cal-OSHA) requirements, as set forth in 8 CCR 5095, *et seq*, shall be implemented by the Applicant.	NS

S = Significant
NS = Not Significant
SU = Significant Unavoidable
SC = Significant Cumulative
B = Beneficial
* = Cannot be Determined at This Time

Table S-1: Summary of Potential Environmental Effects and Mitigation Measures
Imperial Project - Proposed Action

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
Land Use:			
• Mining activities would conflict with existing uses of the Project area and vicinity.	S	4.1.9-1: Applicant shall incorporate project design measures to reduce the effects of the Project on air, biological, visual, and noise resources. 4.1.9-4: Applicant shall keep the USMC air station in Yuma, Arizona apprised of the current schedule for blasting at the mine site to minimize the potential for low-flying military aircraft to be in the vicinity of the Project during blasting activities.	NS
• Mining activities could conflict with adopted land use plans or policies for the area.	S	4.1.9-3: Applicant shall conduct mining operations in conformance with the Class L BLM multiple land use ~~objectives~~ guidelines outlined in the CDCA Plan for mining in the area. The Applicant shall also comply with the federal land use requirements prescribed in 43 CFR 3809.	NS
• Conditions left at the end of the mining activities would conflict with existing uses of the Project area and vicinity.	S	4.1.9-2: At the conclusion of mining activities, Applicant shall recontour all disturbed areas except the pit slopes and the waste rock stockpiles as appropriate to create undulating land forms that are stable, safe, do not allow for extensive pooling or ponding, and blend with the surrounding undisturbed topography. ~~slopes on waste rock stockpiles, ore heap, and pit walls to stable and safe surfaces and drainage conditions.~~ Applicant shall also construct a loose rock rubble barricade comprised of large boulders or other suitable material~~, or provide an alternative method acceptable to the BLM~~ to prevent vehicle access and restrict public entry into the ~~East Pit~~ open pit area(s). 4.1.9-5: To facilitate return of the Project area to as near as practical pre-Project condition, Applicant shall, at the end of the active life of the Project, remove the foundations of all facility structures and dispose of the debris at ~~either~~ an offsite waste disposal facility authorized to accept the waste ~~or an onsite, buried disposal site authorized by both the BLM and the CRWQCB~~.	NS
Socioeconomics:			
• The Project would generate up to 100 local job opportunities, spend $48 million in initial capital expenditures, spend $1.7 million per year in continuing capital expenditures, and spend $26 million per year in non-capital expenditures including payroll. The Project would pay sales taxes on expenditures and pay local property taxes on mine assets.	B	No mitigation required.	B

S = Significant
NS = Not Significant

SU = Significant Unavoidable
SC = Significant Cumulative

B = Beneficial
* = Cannot be Determined at This Time

Table S-1: Summary of Potential Environmental Effects and Mitigation Measures
Imperial Project - Proposed Action

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
Roads~~, Utilities,~~ and Public Services:			
• The Project would adversely impact existing local roads serving the Project vicinity.	S	4.1.11.1-1: Applicant shall realign ~~and maintain~~ an approximate 6,000-foot section of Indian Pass Road around the Project mine and process area prior to surface disturbance which would impede through traffic on the road, and shall maintain~~ed~~ Indian Pass Road open to the public during construction of the relocated portion. Applicant shall maintain Indian Pass Road from the intersection with Ogilby Road to a point beyond the Project mine and process area during the active life of the Project in consultation with the Imperial County Public Works Department. 4.1.11.1-2: Applicant shall not route heavy traffic over Hyduke Road during the transfer of equipment from the Picacho Mine site to the Project area. 4.1.11.1-3: Following completion of backfilling of the West Pit, Applicant shall return that section of Indian Pass Road realigned prior to mine construction back to its approximate original alignment and implement site reclamation activities on the realigned segment. 4.1.11.1-4: Applicant shall post warning signs at the two (2) wash crossings along the relocated portion of Indian Pass Road warning drivers not to cross the wash when flooded, and shall undertake ~~emergency~~ repairs or maintenance, as may be necessary and authorized by Imperial County, if Indian Pass Road is damaged by flooding where it crosses these washes. 4.1.11.1-5: Applicant shall apply water and/or a chemical dust inhibitor acceptable to Imperial County and the BLM to Indian Pass Road from its intersection with Ogilby Road to the boundary of the Project mine and process area. 4.1.11.1-6: Applicant shall acquire the necessary approvals of the BLM and Imperial County to construct the relocated section of Indian Pass Road and the realigned intersection of Indian Pass Road and Ogilby Road, and shall design, construct and maintain these facilities in accordance with the conditions of these permits.	NS
• Mine construction and operations will result in increased traffic over existing roads to the Project area.	NS	4.1.11.1-~~6~~7: Applicant shall encourage employees to carpool to the Project area.	NS

S = Significant
NS = Not Significant

SU = Significant Unavoidable
SC = Significant Cumulative

B = Beneficial
* = Cannot be Determined at This Time

Table S-1: Summary of Potential Environmental Effects and Mitigation Measures
Imperial Project - Proposed Action

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
• New electrical power service will need to be constructed to provided power to the Project mine and process area. In the event of an interruption of utility provided power to the mine, a backup source of power is needed to meet emergency mining operation demand. Privately-owned sections of transmission lines and facilities will subsequently need to be removed at the end of the active life of the mine.	NS	4.1.11.2-1: Applicant shall make available an on-site, diesel-fuel generator to meet emergency power needs for essential loads and services during periods of utility-provided electrical service interruption. 4.1.11.2-34: Applicant shall acquire the necessary approvals of the BLM, Imperial Irrigation District, and other appropriate agencies to construct the 92 kV transmission line over the existing 34.5 kV transmission line, and shall design, construct and maintain this transmission line in accordance with the conditions of these permits, including avoiding the disturbance of any new surface areas during construction. 4.1.11.3-2: When no longer required for Project operations, Applicant shall remove that portion of the 92/~~7.5~~ 7.2 kV transmission line owned by the Project and the electric metering station.	NS
• Mine construction and ancillary activities could result in the destruction of GLO/BLM Cadastral Survey monuments.	NS	4.1.11.3-4: To the extent feasible, all GLO/BLM Cadastral Survey monuments shall be avoided and protected from any accidental damage or destruction. All monuments which may be subject to either intentional or accidental damage or destruction within the Project mine and process area shall be perpetuated by the installation and survey of witness monuments, subject to the prior approval of the survey by the BLM Cadastral Survey and conformance with the applicable California codes.	NS
• There are no sanitation or water utility services available to the Project area to meet sanitation requirements.	S	4.1.11.3-1: Applicant shall provide an on-site septic system for wastewater treatment, which shall be removed upon completion of Project activities. 4.1.11.3-3: Applicant shall obtain necessary permit(s) for on-site sanitary facilities from the Imperial County Department of Health Services.	NS
• Mine communication systems could interfere with military use of the Project area and vicinity.	NS	4.1.11.2-23: Applicant shall work with the USMC to ensure that neither the microwave communication system nor the FM Project communication system interfere with military overflight communications.	NS

S = Significant
NS = Not Significant
SU = Significant Unavoidable
SC = Significant Cumulative
B = Beneficial
* = Cannot be Determined at This Time

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
Emergency Services and Public Safety:			
• The Project area is remote from emergency police, fire, and medical facilities. In the event of an emergency, these services would be slow to arrive.	S	4.1.12-1: Applicant shall provide appropriate levels of on-site security, fire protection services, and emergency first-aid medical services. 4.1.12-8: Applicant shall prepare an emergency response contingency plan which provides for actions to be taken in the event of an injury accident, hazardous materials release, fire, or other emergency situation. The emergency response contingency plan shall include emergency phone numbers and services available for both surface and air transport of injured employees.	NS
• Large quantities of hazardous substances will be stored and used at the mine. Accidental spills or releases of a hazardous substance could result in a public safety hazard.	S	4.1.12-5: Applicant shall prepare a hazardous material spill/release contingency plan and provide appropriate training to all Project employees on the proper response to potential chemical releases. 4.1.12-6: Applicant shall prepare and maintain a hazardous material business plan in conformance with the requirements of Imperial County. 4.1.12-7: Applicant shall conform with all applicable safety regulations required by the Mine Safety and Health Administration (MSHA), Occupational Safety and Health Administration (OSHA), and California Occupational Safety and Health Administration (Cal-OSHA).	NS
• Project activities during the life of the mine, and the ~~The existence of a~~ remnant pits after the completion of mining, ~~and potential pit lake~~ could attract the public onto the site ~~after mining operations and site reclamation activities have been completed~~. This could result in a public safety problem.	S	4.1.12-2: Applicant shall construct and maintain a fence around the perimeter of the Project mine and process area over the life of the Project. 4.1.12-3: Before removal of the perimeter fence at the end of the active life of the Project, Applicant shall construct a loose rock rubble barricade comprised of large boulders or other suitable material~~, or an alternative method acceptable to the BLM,~~ to prevent vehicle access and limit public access to the exposed open pit(s). 4.1.12-4: Applicant shall post no trespassing and hazardous chemical signs in English and Spanish strategically located along perimeter locations of the Project mine and process area.	NS

S = Significant
NS = Not Significant
SU = Significant Unavoidable
SC = Significant Cumulative
B = Beneficial
* = Cannot be Determined at This Time

Table S-2: Summary of Potential Environmental Effects and Mitigation Measures
Imperial Project - Reduced Project Alternative

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
Geology and Mineral Resources:			
Except for leaving the precious metal resources in the East Pit area unmined, there would be no substantive difference in the impacts of the Reduced Project Alternative on geology and mineral resources from those identified for the Proposed Action.	S	Measures to reduce the effects of the Reduced Project Alternative on geology and mineral resources would be the same as those measures identified for the Proposed Action.	NS
Soil Resources:			
The Reduced Project Alternative would decrease the area of surface disturbance from ~~1,400~~ 1,392 acres to ~~861~~ 853 acres, or an approximate 38 percent reduction in surface area disturbed compared to the Proposed Action. This would translate to an approximate 38 percent reduction in the effects of the Project on soil resources. The potential for other impacts, such as erosion, would be reduced to a similar degree as those identified for the Proposed Action as a result of the elimination and/or reduction of Project facilities.	S	Measures to reduce the effects of the Reduced Project Alternative on soil resources would be the same as those measures identified for the Proposed Action.	NS

S = Significant
NS = Not Significant
SU = Significant Unavoidable
SC = Significant Cumulative
B = Beneficial
* = Cannot be Determined at This Time

Table S-2: Summary of Potential Environmental Effects and Mitigation Measures
Imperial Project - Reduced Project Alternative

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
Hydrology (Surface Water and Ground Water):			
The Reduced Project Alternative would eliminate surface facilities from the northeast portion of the Project area and would not impact the existing surface drainage channels in that area. The East Pit would not be mined and thus there would be no potential for ~~a pit lake~~ seeps in the East Pit; however, the ~~elimination of the East Pit would prevent the backfilling of the~~ West Pit would not be backfilled under the Reduced Project Alternative. While the Singer Pit will not be mined below the ground water elevation, the West Pit is projected to be mined to a depth below the existing ground water level. ~~Although comparisons~~ Comparisons of pit inflow and evaporation rates indicate that it is unlikely for a lake to form in the West Pit, ~~there remains some small possibility for this to occur.~~ and Chemgold has committed to backfilling the West Pit to an elevation that is above the predicted level of any pit lake should a study reasonably determine that a pit lake may form. The Reduced Project Alternative would have an estimated life expectancy of ten (10) years, or one-half of the Proposed Action, and an equivalent decrease in ground water production will result from the shortened Project. However, the rate of drawdown over the Reduced Project Alternative life would be comparable to the Proposed Action. The potential for other surface water and ground water impacts would otherwise be approximately proportional to the decrease in the surface disturbance of the Reduced Project to the Proposed Action.	S	Measures to reduce the effects of the Reduced Project Alternative on surface water and ground water resources would be the same as those measures identified for the Proposed Action.	NS
Air Resources:			
The air resource impacts of the Reduced Project Alternative would be approximately the same as air resource impacts generated by the Proposed Action, except that they would be of a shorter duration (approximately ten (10) years instead of twenty (20) years).	S	Measures to reduce the effects of the Reduced Project Alternative on air resources would be the same as those measures identified for the Proposed Action.	NS

S = Significant
NS = Not Significant
SU = Significant Unavoidable
SC = Significant Cumulative
B = Beneficial
* = Cannot be Determined at This Time

Table S-2: Summary of Potential Environmental Effects and Mitigation Measures
Imperial Project - Reduced Project Alternative

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
Biological Resources:			
The Reduced Project Alternative would diminish the loss of shrub/scrub vegetation from ~~1,300~~ 1,292 acres to approximately ~~810~~ 802 acres, and the loss of shrub/tree vegetation from 100 to approximately 51 acres, as a result of mine construction compared to the Proposed Action. Similarly, the decreased surface area of the Reduced Project Alternative would reduce the wildlife habitat losses of desert succulent scrub habitat to approximately ~~810~~ 802 acres and microphyll woodland habitat to approximately 51 acres.	S	Measures to reduce the effects of the Reduced Project Alternative on biological resources would be the same as those measures identified for the Proposed Action.	NS
The effects of the Reduced Project Alternative on vegetation and wildlife resources would otherwise be approximately equivalent to those described for the Proposed Action.			
Cultural and Paleontological Resources:			
The Reduced Project Alternative would create approximately 38 percent less surface disturbance than the Proposed Action. However, the density of cultural resources identified within the area of the Project mine and process area which would <u>not</u> be disturbed under the Reduced Project Alternative is substantially lower than in the portion to be disturbed, and few of the identified sites within this undisturbed area have been judged potentially eligible for the NRHP. Therefore, the impacts of the Reduced Project Alternative on cultural resources appear to be only slightly less than the impacts to cultural resources which would result from the implementation of the Proposed Action.	S	Measures to reduce the effects of the Reduced Project Alternative on cultural resources would be the same as those measures identified for the Proposed Action.	~~NS~~*
Visual Resources:			
The effects of the Reduced Project Alternative on visual resources would be approximately equivalent to those identified for the Proposed Action. The shortened project life would allow site reclamation activities to begin ten (10) years sooner. The effects of the Reduced Project Alternative on visual resources would not meet the BLM ~~Class II~~ visual objectives for CDCA Class L limited use areas.	S	Measures to reduce the effects of the Reduced Project Alternative on visual resources would be the same as those measures identified for the Proposed Action.	SU

S = Significant
NS = Not Significant
SU = Significant Unavoidable
SC = Significant Cumulative
B = Beneficial
* = Cannot be Determined at This Time

Table S-2: Summary of Potential Environmental Effects and Mitigation Measures
Imperial Project - Reduced Project Alternative

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
Noise:			
Noise generated by the Reduced Project Alternative would be approximately the same as noise generated by the Proposed Action, although the duration would be reduced by approximately one-half. The effects of the noise generated on potential noise receptors would be approximately the same as that described for the Proposed Action.	NS	Measures to reduce the noise effects of the Reduced Project Alternative would be the same as those measures identified for the Proposed Action.	NS
Land Use:			
Over the active life of the project, the Reduced Project Alternative would have essentially equivalent effects on land use as those described for the Proposed Action. The ten (10)-year, versus twenty (20)-year, life of mining operations under the Reduced Project Alternative would allow for ~~site~~-reclamation activities to be implemented approximately ten (10) years sooner than for the Proposed Action.	S	Measures to reduce the effects of the Reduced Project Alternative on land use would be the same as those measures identified for the Proposed Action.	NS
Socioeconomics:			
The Reduced Action Alternative would generally reduce the positive socioeconomic effects of the Project as compared to the Proposed Action. Employment opportunities for up to 100 employees would be shortened in duration by approximately ten (10) years. Similarly, non-capital expenditures of $26 million per year ($260 million over ten (1)-year shorter operating life) and associated sales taxes in Imperial County of $1.31 million per year ($13.1 million over the ten (10)-year shorter operating life) would be lost. Initial capital expenditures would not change substantially from those projected for the Proposed Action, but annual capital expenditures of approximately $1.7 million ($17.0 million over the ten (10)-year shorter operating life) and associated sales taxes of approximately $0.13 million per year ($1.3 million over the shorter operating life) would also be lost.	B	No mitigation required.	B

S = Significant
NS = Not Significant
SU = Significant Unavoidable
SC = Significant Cumulative
B = Beneficial
* = Cannot be Determined at This Time

Table S-2: Summary of Potential Environmental Effects and Mitigation Measures
Imperial Project - Reduced Project Alternative

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
Roads~~, Utilities,~~ and Public Services:			
The Reduced Project Alternative will have approximately the same effects on roads, utilities, and public services as would the Proposed Action. The principal differences would be the shortened project life (ten (10) years compared to twenty (20) years), and the inability to backfill the West Pit with mined ~~backfill~~ material because the East Pit will not be mined. Because the West Pit will not be backfilled~~, and because of its proximity to~~ Indian Pass Road, the road will not be returned to ~~its original alignment~~ to the east side of the west diversion at the end of mining operations as indicated in the Proposed Action.	S	Measures to reduce the effects of the Reduced Project Alternative on roads, utilities, and public services would be the same as those measures identified for the Proposed Action.	NS
Emergency Services and Public Safety:			
Over the active life of the Reduced Project Alternative, it will have approximately the same effects on emergency services and public safety as would the Proposed Action.	S	Measures to reduce the effects of the Reduced Project Alternative on emergency services and public safety would be the same as those measures identified for the Proposed Action.	NS

S = Significant
NS = Not Significant
SU = Significant Unavoidable
SC = Significant Cumulative
B = Beneficial
* = Cannot be Determined at This Time

Table S-3: Summary of Potential Environmental Effects and Mitigation Measures Imperial Project - Complete Pit Backfilling Alternative

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
Geology and Mineral Resources:			
Except for the backfilling of the open pits, there would be no substantive difference in the impacts of the Complete Pit Backfill Alternative on geology and mineral resources from those identified for the Proposed Action. However, mineral resources exposed at the bottom of open pits which are not commercially minable under current economic conditions would be unavailable for subsequent mining without potentially cost-prohibitive removal of the backfilled waste rock.	S	Measures to reduce the effects of the Complete Pit Backfill Alternative on geology and mineral resources would be the same as those measures identified for the Proposed Action.	NS
Soil Resources:			
The Complete Pit Backfill Alternative will result in the same impacts on soil resources as described by the Proposed Action. With the backfilling of waste rock and closure of all of the open pits, the effects of surface erosion within the Project area would be expected to decrease slightly compared to those effects identified for the Proposed Action.	S	Measures to reduce the effects of the Complete Pit Backfill Alternative on soil resources would be the same as those measures identified for the Proposed Action.	NS
Hydrology (Surface Water and Ground Water):			
The effects of the Complete Pit Backfill Alternative on surface and ground water resources would remain generally the same as those effects described for the Proposed Action. However, the Complete Pit Backfill Alternative would completely eliminate the remote potential for accumulation of ground water in the East Pit and Singer Pit as described by the Proposed Action.	S	Measures to reduce the effects of the Complete Pit Backfill Alternative on surface water and ground water resources would be the same as those measures identified for the Proposed Action.	NS
Air Resources:			
The air resource impacts of the Complete Pit Backfill Alternative would be essentially the same as air resource impacts generated by the Proposed Action, except that they would be of a longer duration.	S	Measures to reduce the effects of the Complete Pit Backfill Alternative on air resources would be the same as those measures identified for the Proposed Action	NS

S = Significant
NS = Not Significant
SU = Significant Unavoidable
SC = Significant Cumulative
B = Beneficial
* = Cannot be Determined at This Time

Table S-3: Summary of Potential Environmental Effects and Mitigation Measures
Imperial Project - Complete Pit Backfilling Alternative

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
Biological Resources:			
The effects of the Complete Pit Backfill Alternative on biological resources would be essentially the same as those described for the Proposed Action. The Complete Pit Backfill Alternative would eliminate the ~~remote~~ potential for ~~a pit lake to be created~~ seeps to form in the East Pit, as described by the Proposed Action, and would eliminate the potential for creating artificial wetland area. The Complete Pit Backfill Alternative would extend the on-site occupation and potential impacts to wildlife for up to an additional five (5) plus years while backfilling operations are being conducted. Following backfilling and ~~site~~ reclamation activities, fences would be removed and, after an indefinite period, the entire Project area would eventually return to desert wildlife habitat as natural revegetation and restoration processes evolve.	S	With exception of eliminating unnecessary measures to manage wildlife access to the East Pit and Singer Pit ~~potential pit lake,~~ the measures to reduce the effects of the Complete Pit Backfill Alternative on biological resources would be the same as those measures identified for the Proposed Action.	NS
Cultural and Paleontological Resources:			
The Complete Pit Backfill Alternative will result in identical impacts on cultural resources to those created by the Proposed Action.	S	Measures to reduce the effects of the Complete Pit Backfill Alternative on cultural and paleontological resources would be the same as those measures identified for the Proposed Action.	~~NS*~~
Visual Resources:			
The effects of the Complete Pit Backfill Alternative on visual resources would be approximately equivalent to those identified for the Proposed Action over the active life of the Project. Human occupation and activities would be visually evident for up to an additional five (5) plus years while backfilling operations were conducted. However, backfilling operations would reduce the size of the waste rock stockpiles and return the landscape to a topographic condition more similar to the pre-Project status than the Proposed Action.	S	Measures to reduce the effects of the Complete Pit Backfill Alternative on visual resources would be the same as those measures identified for the Proposed Action.	SU

S = Significant
NS = Not Significant
SU = Significant Unavoidable
SC = Significant Cumulative
B = Beneficial
* = Cannot be Determined at This Time

Table S-3: Summary of Potential Environmental Effects and Mitigation Measures
Imperial Project - Complete Pit Backfilling Alternative

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
Noise:			
Noise generated by the Complete Pit Backfill Alternative would be approximately the same as noise generated by the Proposed Action, and the effects of the noise generated on potential noise receptors would also be approximately the same as that described for the Proposed Action. However, backfilling operations would extend the period during which noise is generated in the Project area by up to an additional five (5) plus years.	NS	Measures to reduce the noise effects of the Complete Pit Backfill Alternative would be the same as those measures identified for the Proposed Action.	NS
Land Use:			
Over the active life of the Project, the Complete Pit Backfill Alternative would have essentially equivalent effects on land use as those described for the Proposed Action. Backfilling operations would extend the period of time during which dispersed recreation and other uses in the vicinity would be excluded from the Project mine and process area or be indirectly affected. However, the long-term barricading of the East Pit and Singer Pit areas would be subsequently unnecessary and would allow public access to the entire Project area following backfilling and site reclamation activities.	S	Measures to reduce the effects of the Complete Pit Backfill Alternative on land use would be the same as those measures identified for the Proposed Action.	NS
Socioeconomics:			
The Complete Pit Backfill Alternative would have the same positive socioeconomic effects as the Proposed Action over the life of the mining operations. In addition, a smaller staff of workers would be employed or contracted for the up to five (5) plus-year period needed to complete the backfilling operations, and expenditures of approximately $125 would be required to backfill the pit(s). Because the cost of backfilling exceeds the anticipated return on the Project, such a project would not be pursued by a prudent project developer.- ~~However, the cost of backfilling is estimated at $136 million.~~	B	No mitigation required.	B

S = Significant
NS = Not Significant

SU = Significant Unavoidable
SC = Significant Cumulative

B = Beneficial
* = Cannot be Determined at This Time

Table S-3: Summary of Potential Environmental Effects and Mitigation Measures
Imperial Project - Complete Pit Backfilling Alternative

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
Roads~~, Utilities,~~ and Public Services:			
The Complete Pit Backfill Alternative will have approximately the same effects on roads, utilities, and public services as would the Proposed Action. However, the access roads to the Project area will continue to be utilized during the up to five (5)-year plus period needed to backfill the pits.	S	Measures to reduce the effects of the Complete Pit Backfill Alternative on roads, utilities, and public services would be the same as -those measures identified for the Proposed Action.	NS
Emergency Services and Public Safety:			
Over the active life of the Complete Pit Backfill Alternative, it will have approximately the same effects on emergency services and public safety as would the Proposed Action. However, the Complete Pit Backfill Alternative will result in the backfilling of all of the pits within the Project mine and process area and would, thereby, totally eliminate the potential safety hazard from the public entering the Project mine and process area to access the unfilled East Pit and Singer Pit.	S	Except for the eliminating the need to barricade the unfilled East Pit and Singer Pit to restrict access after the completion of backfilling and site reclamation operations, the measures to reduce the effects of the Complete Pit Backfill Alternative on emergency services and public safety would be the same as those measures identified for the Proposed Action.	NS

S = Significant
NS = Not Significant
SU = Significant Unavoidable
SC = Significant Cumulative
B = Beneficial
* = Cannot be Determined at This Time

Table S-4: Summary of Potential Environmental Effects and Mitigation Measures
Imperial Project - No Action Alternative

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
Geology and Mineral Resources:			
No adverse impacts on geology or mineral resources would result from the No Action Alternative. The disapproval of the proposed Imperial Project could discourage future proposals for mining of, and/or maintaining claims for, the precious mineral resources within the Project area.	*NS	No mitigation required.	*NS
Soil Resources:			
No adverse impacts on soil resources in the Project area would result from the No Action Alternative.	*NS	No mitigation required.	*NS
Hydrology (Surface Water and Ground Water):			
No adverse impacts on surface water or ground water resources in the Project area would result from the No Action Alternative.	*NS	No mitigation required.	*NS
Air Resources:			
No adverse impacts on air resources within, or in the vicinity of, the Project area would result from the No Action Alternative.	*NS	No mitigation required.	*NS
Biological Resources:			
No adverse impacts on biological resources within, or in the vicinity of, the Project area would result from the No Action Alternative.	*NS	No mitigation required.	*NS
Cultural and Paleontological Resources:			
No adverse impacts on cultural or paleontological resources within, or in the vicinity of, the Project area would result from the No Action Alternative.	*NS	No mitigation required.	*NS
Visual Resources:			
No adverse impacts on visual resources would result from the No Action Alternative.	*NS	No mitigation required.	*NS

S = Significant
NS = Not Significant
SU = Significant Unavoidable
SC = Significant Cumulative
B = Beneficial
* = Cannot be Determined at This Time

Table S-4: Summary of Potential Environmental Effects and Mitigation Measures
Imperial Project - No Action Alternative

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
Noise:			
No adverse noise impacts would result from the No Action Alternative.	~~*~~NS	No mitigation required.	~~*~~NS
Land Use:			
With the probable exception of the discontinuance of mining exploration activities, the existing land use within, and in the vicinity of, the Project area would be unaffected by the No Action Alternative.	~~*~~NS	No mitigation required.	~~*~~NS
Socioeconomics:			
The No Action Alternative would not create the 100 job opportunities nor the annual payroll from the proposed Project. The No Action Alternative would also result in the loss of the $48 million initial capital expenditures, $1.7 million annual capital expenditures, and the $26 million per year non-capital expenditures and associated taxes and benefits to the local economy projected by the Imperial Project.	~~*~~NS	No mitigation required.	~~*~~NS
Roads~~, Utilities,~~ and Public Services:			
No adverse impacts on roads, utilities, or public services within, or in the vicinity of, the Project area would result from the No Action Alternative.	~~*~~NS	No mitigation required.	~~*~~NS
Emergency Services and Public Safety:			
No adverse impacts on emergency services or public safety provided to, or in the vicinity of, the Project area would result from the No Action Alternative.	~~*~~NS	No mitigation required.	~~*~~NS

S = Significant
NS = Not Significant
SU = Significant Unavoidable
SC = Significant Cumulative
B = Beneficial
* = Cannot be Determined at This Time

IMPERIAL PROJECT
DRAFT ENVIRONMENTAL IMPACT STATEMENT/
ENVIRONMENTAL IMPACT REPORT

TABLE OF CONTENTS

Page

Page

Page

Page

Page

Page

Page

Page

Page

LIST OF FIGURES

Page

LIST OF TABLES

Page

LIST OF APPENDICES

1. INTRODUCTION

Chemgold, Inc. (Chemgold) has proposed the development of the Imperial Project (Project), an open-pit, heap leach, precious metal mine and processing facility located in eastern Imperial County, California which would utilize conventional heap leach mining methods to extract gold and silver from the mined ore (see Chapter 10 for a glossary, list of acronyms, and for definitions of selected terms). The Project would include: mining gold and silver ore and waste rock at a maximum average operating rate of 130,000 tons per day for up to twenty (20) years; constructing and operating facilities to administer the operation; maintenance of all mining and related equipment; processing the ore and stockpiling the waste rock; developing and producing ground water for use in processing operations; performing continuing mineral exploration activities; implementing environmental impact reduction measures; and implementing site reclamation measures. The proposed Project has been designed to meet the anticipated permit requirements of the various federal, state and local agencies which regulate mining in the area.

Up to 150 million tons of ore would be leached on the heap leach pad. At a waste-to-ore (waste:ore) ratio of up to 3:1, up to 450 million tons of waste rock would be deposited in the waste rock stockpiles or the mined-out portions of the open pits. Mining activities, performed 24 hours per day and seven (7) days per week, would commence in 1997, after the acquisition of all required approvals, and would terminate in approximately the year 2016.

This Environmental Impact Statement/Environmental Impact Report (EIS/EIR) is being jointly prepared by the Bureau of Land Management (BLM), which is the Lead Agency with respect to compliance with the National Environmental Policy Act (NEPA) and its implementing regulations, and the Imperial County Planning~~-and-~~/Building Department (ICPBD), which is the Lead Agency responsible for compliance with the California Environmental Quality Act (CEQA). This EIS/EIR has been prepared as two (2) separate volumes, which together comprise the entire document. Volume I of this document contains the Summary, the Table of Contents, ~~main text, consisting of~~ Chapters 1 through 11, and Appendix A (the Imperial Project Reclamation Plan). ~~; and~~ Volume II~~, which~~ contains all of the other appendices.

1.1. Purpose and Need for the Project

The Bureau of Land Management (BLM) is responsible for administering mineral rights access on federal lands as authorized by the General Mining Law of 1872. Under this law, qualified prospectors are entitled to reasonable access to mineral deposits on public domain lands.

The purpose of the Project is to develop and operate a mine to recover the gold and silver ore resources identified on mining claims which have been staked or acquired by Chemgold, Inc. under the General Mining Law of 1872. Chemgold's objective for the Project is to profitably recover precious metals (gold and silver) from these staked mining claims to the optimal extent possible, and reclaim the Project area in a manner that is environmentally responsible and in substantial compliance with United States mining laws, the California Desert Conservation Area (CDCA) Plan, the Federal Land Policy and Management Act (FLPMA), the California Surface Mining and Reclamation Act (SMARA) and Imperial County's implementing regulations, and other applicable laws and regulations. The need is to meet the prevailing market demand for gold and silver.

The purpose of this EIS/EIR is to analyze the impacts of the proposed Project, including the identified reasonable alternatives, so that decision-makers will have adequate information upon which to base their decision to approve or deny the Project or alternative development scenarios.

1.2. Project Location

The Project is located in eastern Imperial County, California, approximately 45 miles northeast of El Centro, California and 20 miles northwest of Yuma, Arizona (Figure 1-1). The Project is located within Sections 28, 29, 30, 31, 32 and 33, Township 13 South, Range 21 East, and Sections 4, 5, 6, 7, and 8, Township 14 South, Range 21 East, San Bernardino Baseline & Meridian (SBB&M), on public lands administered by the Bureau of Land Management (BLM). The boundary of the Project mine and process area is presented in Figure 1-2.

Access to the Project area is from Ogilby Road via Interstate 8 from the south, or from State Route 78 to the north. The Project mine and process area overlaps Imperial County-maintained Indian Pass Road, and is located approximately five (5) miles northeast of the Indian Pass Road/Ogilby Road intersection.

The Project mine and process area boundary encompasses approximately ~~1,612~~ 1,589 acres on a broad, south- and west-facing, alluvial plain south of Indian Pass in the Chocolate Mountains, between the Cargo Muchacho Mountains, approximately four (4) miles south, and Peter Kane Mountain, approximately six (6) miles north. The elevation over the Project mine and process area ranges from about 760 feet to 925 feet. The Project lies near the center of the mining district formed by the active Picacho, Mesquite, and American Girl heap leach gold mines, each located approximately 10 miles from the Project mine and process area.

Figure 1-1: Imperial Project General Location Map

Figure 1-2: Imperial Project Vicinity Map

1.3. Principal Agency Policies and Authorizing Actions

1.3.1. Bureau of Land Management

This EIS/EIR was prepared in conformance with the policy guidance provided in BLM's National Environmental Policy Act (NEPA) Handbook (BLM Handbook H-1790-1). The handbook provides instructions for compliance with the Council on Environmental Quality's (CEQ's) regulations for implementing the procedural provisions of NEPA and the Department of Interior's manual guidance on NEPA (516 DM 1-7).

The BLM NEPA handbook also provides guidance on monitoring. Three (3) distinct purposes of monitoring are identified and, if the Project is approved, would be applicable, including:

(1) Compliance Monitoring: As part of the Record of Decision (ROD) on the Project, committed mitigation measures and related monitoring and enforcement activities, if any, for the selected alternative will be identified. Stipulations which will become part of the BLM's authorization will be attached to the ROD or incorporated by reference from this EIS/EIR or other applicable requirements. Any measures to avoid or reduce environmental harm identified in this EIS/EIR which are not adopted will also be identified with an explanation of why the measures were not adopted. NEPA requires that decisions on a project be implemented in accordance with the ROD. The BLM will perform compliance monitoring to ensure that actions taken comply with the terms, conditions, and mitigation measures identified in the ROD.

(2) Effectiveness or Success Monitoring: Determining if decisions made in the ROD are achieving intended environmental objectives may require monitoring the effectiveness or success of the actions or decisions. Effectiveness monitoring is not required by NEPA unless specified in the ROD. However, monitoring requirements specified in this EIS/EIR will be incorporated into the ROD. Effectiveness monitoring will typically be required to determine the effectiveness or success of identified mitigation measures.

(3) Evaluation of Validity Monitoring: Monitoring to determine if a decision continues to be correct or appropriate over time is another purpose of monitoring. Evaluation of decision validity monitoring is not required by NEPA, and it is usually not routinely needed for all decisions covered by an EIS. Evaluation monitoring goes beyond effectiveness monitoring and focuses on examining the validity of the environmental objectives. Evaluation monitoring would be used to determine if the terms, conditions, and mitigation measures prescribed by the

ROD are still needed to achieve environmental objectives, or if they are greater than necessary or less than necessary to achieve environmental objectives.

Surface Management Authorizations and Relevant Plans:

BLM regulations for surface management of public land being mined under the general mining law (43 CFR 3809) recognize the statutory right of mineral claim holders such as Chemgold to explore for, and develop, federal mineral resources, and encourages such development. These federal regulations require the BLM to review proposed operations to ensure that: (1) adequate provisions are included to prevent unnecessary or undue degradation of public lands; (2) measures are included to provide for reclamation; and (3) the proposed operations comply with other applicable federal, state and local laws and regulations. Chemgold has submitted to the BLM a proposed Plan of Operations (POO) as required under these regulations.

The Project would be located within the California Desert Conservation Area (CDCA), which has been identified by Congress in the Federal Land Policy and Management Act of 1976 (FLPMA) as a unique area in need of special management by the BLM. Use of the lands and natural resources within the CDCA are guided by the 1980 CDCA Plan (as amended). All of the Project area would be located within multiple use Class L - Limited Use, which is the second-most restrictive of the four (4) classifications. Management of Class L areas is "oriented towards giving priority protection to sensitive natural, scenic, ecological, and cultural resources while placing limitations on other uses that may conflict with or degrade these values." (USDI, 1980)~~.~~ The multiple use guidelines adopted for implementing the CDCA Plan in Class L lands recognize that locatable mineral operations are non-discretionary, but state that the development of locatable minerals on Class L lands will be limited to activities necessary to achieve extraction with minimum environmental impact, using best available mitigation technology and most effective feasible reclamation practices. The Proposed Action would be in conformance with the CDCA and the multiple use class guidelines applicable for this classification.

Site Reclamation Requirements:

The Mining and Mineral Policy Act of 1970 (MMPA) mandates that federal agencies ensure that closure and reclamation of mine operations be completed in an environmentally responsible manner. The MMPA states that the federal government should promote the:

> "... development of methods for the disposal, control, and reclamation of mineral waste products, and the reclamation of mined lands, so as to lessen any adverse impact of mineral extraction and processing upon

the physical environment that may result from mining or mineral activities."

The BLM's long-term reclamation goals are to shape, stabilize, revegetate, or otherwise treat disturbed areas in order to provide a self-sustaining, safe, and stable condition that provides a productive use of the land which conforms to the approved land-use plan for the area. The short-term reclamation goals are to stabilize disturbed areas and to protect both disturbed and adjacent undisturbed areas from unnecessary or undue degradation. Relevant BLM policy and standards for reclamation are set forth in the BLM Solid Minerals Reclamation Handbook (BLM Manual Handbook H-3042-1) which provides consistent reclamation guidelines for all solid non-coal mineral activities conducted under the authority of the BLM minerals regulations in Title 43 of the Code of Federal Regulations (BLM, 1992a). The BLM ~~will review~~ has reviewed the site reclamation portions of the Chemgold Imperial Mine POO to ensure that the Project would meet BLM's reclamation standards and goals (see Appendix A).

Cyanide Management Plan Requirements:

The BLM's national cyanide management policy requires the BLM state offices to prepare a Cyanide Management Plan. The California State Office of the BLM prepared and administers the California Cyanide Management Plan (BLM, 1992b). The plan is applicable to all public lands administered by the BLM in California, and it would be applicable to the proposed Imperial Project cyanide heap leaching and relevant precious metal recovery processes. The plan provides guidance on cyanide use in mining activities and lists the following objectives:

(1) Implement the BLM's national cyanide management policy;

(2) Ensure that mining operations using cyanide on BLM managed lands follow best management practices and do not cause unnecessary or undue degradation of the federal lands;

(3) Provide both the mine operator and the BLM technical staff with standards for development and evaluation of mining projects that use cyanide; and

(4) Use State Standards, if established.

The plan is not intended to duplicate requirements of other federal or state agencies with responsibility for managing the use of cyanide in mining operations. Where standards are established for mining operations by a responsible California Regional Water Quality Control Board (CRWQCB), such standards shall apply when reviewing

a notice or a POO. BLM ~~will review~~ has reviewed the Chemgold Imperial Project POO to ensure that it is in conformance with the California Cyanide Management Plan.

1.3.2. Imperial County

The state-mandated Imperial County General Plan (General Plan) was developed to create a balanced, comprehensive guide for future physical growth of lands within the County, and provide mechanisms to achieve the County's desired goals and objectives (County of Imperial, 1993e). The General Plan strives towards achieving a balance between development and economic, social, and environmental resources. The General Plan consists of nine (9) elements: Land Use, Housing, Circulation and Scenic Highways, Noise, Seismic and Public Safety, Agriculture, Conservation and Open Space, Geothermal and Transmission Resources, and Water Resources (County of Imperial, 1993e).

The Project is located entirely on federal public lands managed by the BLM. As such, Imperial County land use zoning requirements may not be strictly binding. However, the Project is required to comply with the California Surface Mining and Reclamation Act of 1975 (SMARA) and the applicable California Department of Conservation regulations, as implemented by the County of Imperial through the Planning~~and~~/Building Department. These regulations relate to: mining operation and closure; end land use; environmental setting/fish and wildlife habitat; geotechnical requirements; erosion and sediment control; resoiling and revegetation; and administrative requirements. Approval of the Project's proposed methods of compliance with SMARA must be obtained from Imperial County prior to the commencement of construction, and the County may adopt conditions to the approval of the Reclamation Plan.

Current Imperial County Ordinances also require the approval of a Conditional Use Permit (CUP) prior to commencing the drilling of the ground water production wells ~~of the size~~ proposed by Chemgold.

1.3.3. Authorizing Actions

Based upon information received during the scoping process and during subsequent discussions with various agencies, certain authorizing actions have been identified as required, or probably required, prior to construction or operation of the Project. A list of these authorizing actions, organized by agency, is provided in Table 1-1.

1.4. Intended Uses of this EIS/EIR

The purpose of this joint EIS/EIR is to provide the decision-makers in all agencies required to approve authorizing actions (see Section 1.3.3) with sufficient information to: (1) make informed decisions regarding the anticipated significant impacts of the Proposed Action; and (2) determine if possible mitigation measures or alternatives are available which could reduce those identified impacts of the Proposed Action to below the level of significance. The joint EIS/EIR is also intended to provide this same information to the concerned public and solicit their comments.

1.5. Public Scoping and Consultation

A Notice of Intent (NOI) to prepare an EIS was published in the Federal Register on March 24, 1995. A Notice of Preparation (NOP) of an EIR was distributed by Imperial County on April 5, 1995. A copy of the NOI, the NOP, and the NOP distribution list are included in this EIS/EIR in Appendix ~~A~~ B. As a result of distribution of the NOI and the NOP, a total of 16 comment letters were received which addressed both specific and general issues regarding the Project. These comments have also been attached to this EIS/EIR in Appendix ~~A~~ B.

Two (2) public scoping meetings were held prior to the preparation of the Draft EIS/EIR to receive public comments, identify concerns, and evaluate viable alternatives. The first public meeting was held at the El Centro Community Center on April 17, 1995. The second public meeting was held at the Yuma Days Inn Suites on April 18, 1995. A total of ~~approximately 30~~ 11 members of the public attended these meetings, during which four (4) comments were offered. A summary of the issues discussed at these scoping meetings is attached to this EIS/EIR in Appendix ~~A~~ B. The contents of this EIS/EIR respond to the issues raised during the scoping process.

Table 1-1: Agency Authorizing Actions Required for the Imperial Project

AGENCY		PERMIT NAME
Bureau of Land Management	El Centro Resource Area	Approve Plan of Operations for mine and process operations
		Approve Right-of-Way for existing and relocated sections ~~Relocation~~ of Indian Pass Road
		Approve Right-of-Way for new and rebuilt transmission lines and water wells and pipeline
		Complete Nation-to-Nation consultation with the Quechan Tribe
		Issue Record of Decision in conformance with the National Environmental Policy Act
United States Fish and Wildlife Service		Issue Opinion in Formal Consultation with BLM under Section 7 of the federal Endangered Species Act
United States Army Corps of Engineers		~~Notification of Nationwide Permit Use~~ Approve Individual Clean Water Act Section 404 Permit
Bureau of Alcohol, Tobacco and Firearms		Approve Use~~r~~ of High Explosives Permit
California Regional Water Quality Control Board	Colorado River Basin Region	Approve Waste Discharge Requirements for discharges of waste to land
		Approve~~d~~ National Pollutant Discharge Elimination System Permit (NPDES) for Storm Water Discharge During Construction
		Approve National Pollutant Discharge Elimination System Permit (NPDES) for Storm Water Discharge from Industrial Facilities
		Approve Certification of Compliance with Section 401 of the federal Clean Water Act
California Department of Fish and Game		Approve California Endangered Species Act (Fish and Game Code Section 2081) Management Permit
		Approve Stream or Lake Alteration Agreement (Fish and Game Code Section 1601 or 1603)
California State Office of Historic Preservation		Section 106 Process
Imperial County	Planning and Building Department	Approve Conditional Use Permit for drilling ground water production wells
		Approve Reclamation Plan and Interim Management Plan for Project mine and process area facilities
		Certify Final Environmental Impact Report in conformance with the California Environmental Quality Act
		Approve Building Permits and Certificate of Occupancy
	Department of Health Services	Approve Individual Septic Disposal System Permit
		Approve Water System Permit
	Air Pollution Control District	Approve Authority to Construct to construct for applicable air pollution emission units
		Approve Permit to Operate to operate applicable air pollution emission units
	Department of Public Works	Approve Encroachment Permit for Project access off, and relocation of, Indian Pass Road
	Board of Supervisors	Approve Revocation of Road for Project relocation of Indian Pass Road
	Fire Department	Approve Plan Review for conformance with Uniform Fire Code

2. ALTERNATIVES INCLUDING THE PROPOSED ACTION

This chapter has been prepared in conformance with the standard recommended format found in 40 CFR 1502.10(e) and 40 CFR 1502.14, and the CEQA guidelines (14 CCR 15124 and 14 CCR 15126(d)). The following sections describe the Proposed Action; alternatives to the Proposed Action, including the No Action Alternative; and alternatives eliminated from detailed analysis. Alternatives selected by the Lead Agencies for consideration in this EIS/EIR are based on potential impacts associated with the Proposed Action and issues identified through the scoping process.

Alternative design and processes to the Proposed Action were developed through initial project scoping, consultation with other agencies and the public, and by the Imperial County Planning/Building Department and the BLM. Alternatives to be considered under NEPA and CEQA are those which could feasibly attain the Imperial Project's objectives and are capable of either eliminating any of the significant adverse environmental effects of the Proposed Action or reducing them to a level of insignificance (even if such alternatives would be more costly or, to some degree, would impede the project's objectives). The range of alternatives is also guided by the "rule-of-reason." Alternatives are developed to satisfy an identified purpose or need, or in resolving issues presented as a result of the environmental review process. The EIS/EIR is required to explore and evaluate possible alternatives and, if an alternative is found to be infeasible or unreasonable and, thus, not considered further, the EIS/EIR must briefly explain the reasons for elimination.

The Imperial Project (Project) is a proposal to develop an open-pit precious metal mining operation utilizing heap leach processes. Up to 150 million tons of ore would be leached and 450 million tons of waste rock would be deposited at the proposed waste rock stockpiles or the mined-out portions of the three (3) planned open pits. Facilities to administer the operation, maintain all mining and related equipment, process the ore, and stockpile waste rock would also be constructed. A ground water production well field, consisting of up to four (4) ground water production wells, would be completed and used to provide water for processing operations, dust control and domestic uses. Additional mineral exploration activities would be conducted to seek future ore reserves within the Project mine and process area. Environmental impact reduction measures and reclamation activities would be performed to minimize or eliminate potential environmental impacts.

2.1. Proposed Action

2.1.1. Introduction

The Project is a proposed open-pit, heap leach, precious metal mine which would utilize conventional heap leach mining methods. The Project would include: mining gold and silver ore and waste rock at a maximum average operating rate of 130,000 tons per day for up to twenty (20) years; constructing facilities to administer the operation; maintenance of all mining and related equipment; processing the ore and stockpiling the waste rock; developing and producing ground water for use in processing operations; ~~performing continuing~~ conducting exploration activities; implementing environmental impact reduction measures; and implementing site reclamation measures. The proposed Project has been designed to meet the anticipated permit requirements of the various federal, state and local agencies which regulate mining ~~in the area~~.

The proposed Project would consist of the following components:

- Three (3) open pits, identified as the West Pit, East Pit and Singer Pit, and one (1) Mineralized Potential Area, co-joining the three (3) separate pits;

- ~~Four (4)~~ Three (3) waste rock stockpiles;

- Four (4) soil stockpile sites~~.~~;

- One (1) administration office and maintenance facility area;

- Ore processing facilities;

- One (1) precious metal recovery plant and other related facilities;

- A system of roads internal to the Project ~~site~~ mine and process area which would connect the various facility components;

- One (1) electrical power substation, an electrical metering station, a 4.5-mile section of new 92/~~7.5~~ 7.2 Kv transmission line, and a 16-mile existing utility-owned 34.5 kV transmission line which would be "overbuilt" with a new utility-owned 92 kV transmission line~~.~~;

- One (1) ground water well field, consisting of up to four (4) production wells, designed to produce ground water at a peak rate of approximately

1,000 gallons per minute (gpm) and peak yield of approximately 1,200 acre feet per year (afy), and an associated water pipeline; and

- Relocated portions of Indian Pass Road, including realignment of the intersection of Indian Pass Road and Ogilby Road and the relocation of an approximately 6,000-foot portion of Indian Pass Road, which would be moved approximately 1,000 feet to the west of its current location to provide continuing public access to areas northeast of the Project.

Up to 150 million tons of ore would be leached under the Proposed Action. At a waste:ore ratio of up to 3:1, up to 450 million tons of waste rock would be deposited in the waste rock stockpiles or the mined-out portions of the open pits. Mining activities, performed 24 hours per day and seven (7) days per week, would commence in early 1997~~,~~ and would terminate by approximately the year 2016.

As discussed throughout this document, the "Project area" consists of a "Project mine and process area" and a "Project ancillary area." The Project mine and process area would contain all of the open pits, waste rock stockpiles, soil stockpiles, administration office and maintenance facility area, heap leach facility, precious metal recovery plant and other facilities, and internal roads. The Project ancillary area would include the ground water production wells and water pipeline, the electrical power metering station and new 92 kV transmission line, and the relocated portions of Indian Pass Road. ~~Since the~~ The "rebuilt" utility-owned 92 kV transmission line ~~would not create any new surface disturbance, but would only redisturb during construction areas which had been previously disturbed by the original construction of the transmission line, it~~ is not included as part of the Project area when discussed in this document, but ~~it~~ is separately described as the "rebuilt" or "overbuilt" 92 kV transmission line.

Figure 2-1 shows the boundaries of the Project mine and process area and a shaded area indicating the Project ancillary area. The locations of the major facilities proposed within the Project mine and process area are presented in Figure 2-2. The proposed Project would create a maximum of approximately ~~1,400~~ 1,392 acres of new surface disturbance, all within the Project area. An itemized list of surface disturbance for each of the major Project facilities, together with the undisturbed acreage within the Project mine and process area and Project ancillary area, is presented in Table 2-1.

Figure 2-1: Imperial Project Facility Locations

Figure 2-2: Imperial Project Mine and Process Area Facilities

2.1.2. Construction

The construction of the Project facilities would commence once necessary approvals are obtained from the appropriate regulatory agencies. The initial construction phase of the Project would take up to six (6) months. Additional construction activities would also occur during the mine life, particularly during the completion of the later phases of the heap leach pad construction (see Section 2.1.8.1). Equipment necessary for construction activities would include a portable screen plant and crusher, scrapers, dozers, rollers, graders, portable generators, and other related equipment. As discussed in Section 2.1.9.1, employment of up to approximately 100 individuals would be necessary to complete initial construction activities. Construction activities which would occur during the routine mining operations would require up to 40 individuals. Construction activities related to the overbuilding of the 34.5 kV transmission line are discussed in Section 2.1.9.3.1.

2.1.3. Mining

"Ore" is an economic term used to describe a resource which can be profitably mined and processed. The size and configuration of the proposed pits is defined by the precious metals content, depth of mineralization, metallurgy and other geologic, geotechnical and economic factors.

Based on the results of ongoing exploration and development drilling, three (3) ore zones have been delineated. These would be mined as the proposed West Pit, Singer Pit, and East Pit (see Figure 2-2). The Mineralized Potential Area, which co-joins the proposed pits, delineates the currently known outer boundary of potential mining activity. ~~If economically viable, the Mineralized Potential Area would be mined, thus creating one (1) large pit.~~ The estimated pit dimensions resulting from development of the currently known ore zones are listed in Table 2-2. ~~The final pit floor elevations may be lower if the Mineralized Potential Area can be economically mined.~~

In the waste rock stockpile and leach pad areas, exploratory "condemnation" drilling was conducted on approximately 2,000-foot centers to identify possible open pit-type reserves. Drilling results from the waste rock stockpile and heap areas indicated that no continuity between assays or holes were identified which would indicate the presence of a minable resource at those sites.

Mining of the ore zones would employ conventional open pit mining techniques. The mining sequence would be phased, with the West Pit mined first, followed by mining of the East Pit, followed by mining of the Singer Pit. Mining in the

Mineralized Potential Area, if undertaken, may also occur prior to mining of the East Pit. Figure 2-3 shows the projected final ~~contours~~ configuration of the West Pit following the completion of mining of that pit.

Figure 2-3: Imperial Project Mine and Process Area - Projected West Pit Contours

Table 2-1: Estimated Disturbed and Undisturbed Acres for the Imperial Project

MINE FACILITY COMPONENT		DISTURBED ACRES	UNDISTURBED ACRES
Mine and Process Area			
Pits	West Pit	124	
	East Pit	227	
	Singer Pit	34	
	Mineral Potential Area	68	
	Subtotal:	**453**	
Process Facilities	Pad	329	
	Process Facility Area	21	
	Lime Bin Area and Fresh Water Pond	1	
	Subtotal:	**351**	
Waste Rock Stockpiles	East Waste Rock Stockpile	73	
	West Waste Rock Stockpile~~s (two adjacent stockpiles)~~	~~28~~20	
	South Waste Rock Stockpile	224	
	Subtotal:	**~~325~~317**	
Soil Stockpiles	West Soil Stockpile	3	
	North Soil Stockpiles (two adjacent stockpiles)	21	
	South Soil Stockpile	17	
	Subtotal:	**41**	
Support Facilities	Office/Maintenance/Parking/Power	14	
	Haul and Maintenance Roads	164	
	Drainage Diversions	16	
	Subtotal:	**194**	
Mine and Process Area Subtotals:		~~1,364~~1,356	~~248~~233
Total Mine and Process Area Acreage:		**~~1,612~~1,589**	
Ancillary Area			
County Road Realignment		7	
Powerline, Water Wells and Pipeline Route		29	
Ancillary Area Subtotals:		36	-
Total Ancillary Area Acreage:		**36**	
TOTAL PROJECT AREA DISTURBED AND UNDISTURBED ACREAGE:		**~~1,400~~1,392**	**~~248~~233**
TOTAL PROJECT AREA ACREAGE:		**~~1,648~~1,625**	

Table 2-2: Projected ~~Maximum~~ Surface Dimensions, Depth from Surface, and Pit Floor Elevations of the Open Pits

PIT	PROJECTED ~~MAXIMUM~~ PIT DIMENSIONS			PIT FLOOR ELEVATION (ft AMSL)
	LENGTH (ft)	WIDTH (ft)	DEPTH (ft)	
West Pit	2,700	2,700	760	~~-60~~100
East Pit	4,700	2,700	880	-60
Singer Pit	1,000	2,000	400	460

It is anticipated that waste rock would be placed on waste rock stockpiles adjacent to the pits or, as mining proceeds from one pit to the next, into previously mined-out open pits. As mining progresses, the West Pit would be entirely backfilled. Subsequent backfill would then be placed into other open pits whenever access to additional economic mineralization is not impeded. Figure 2-4 shows the projected final ~~contours~~ configuration of the East Pit and the backfilled West Pit subsequent to the completion of mining and placement of waste rock, and prior to the commencement of final reclamation. If unanticipated circumstances arose which would necessitate a cessation of mining activities, no post-mining placement of waste rock in the pits would be conducted, except as may be necessary to raise the floor of the pit above the level of any predicted pit lake which may be formed from the inflow of ground water.

The overburden thickness above the ore zones ranges from 40 to 350 feet and consists mostly of alluvial gravels (both unconsolidated and cemented) and minor amounts of volcanic rock. Mining of the unconsolidated gravels may not require blasting; however, the cemented gravels are expected to require blasting prior to excavation. Ore and some waste rock are comprised of weakly-altered gneiss. All of this material is expected to require drilling and blasting prior to excavation.

Mobile rotary blast hole drills would drill 6-3/4-inch to 10-inch diameter blast holes spaced on between 16- and 35-foot centers. The rock would be blasted with a conventional ammonium nitrate/fuel oil (ANFO) blasting agent, although an emulsion blasting agent may be used in the event water is found in the drill holes. Blasting would ~~average between~~ generally occur three (3) ~~and~~ to five (5) times per week during daylight hours.

The blasted rock would be loaded, using an electric shovel or diesel front-end loader(s)/shovel(s), into 240-ton, or larger, capacity haul trucks. No crushing of the ore is anticipated, and run-of-mine (ROM) ore would be hauled by the haul trucks

Figure 2-4: Imperial Project Mine and Process Area - Projected Final Contours

directly to the heap leach pad. Waste rock would also be hauled directly to a waste rock stockpile, or hauled to one of the pits to be backfilled (see Section 2.1.5). Haulage ramps in the pit have been designed with a minimum width of 100 feet and a maximum gradient of 10 percent. Minor sections of temporary ramping may be steeper and narrower. Haulage roads outside of the pit areas would be typically up to 100 feet wide, and in some areas would be 150 feet wide to allow for surface drainage areas and separate lanes for support vehicle traffic.

Engineering analysis and Chemgold's experience at Chemgold's Picacho Mine, located in Imperial County approximately 8 miles to the east of the Project mine and process area, indicates that the ultimate pit walls would have overall slope angles of about 50 degrees (1 horizontal to 1.2 vertical (1H:1.2V)). Pit walls would have safety benches at regular vertical intervals to contain minor rock spills. Pit wall slopes may change as actual mining conditions and geotechnical and safety factors warrant.

Piezometer and exploration drill holes drilled in the projected locations of the bottoms of the East Pit and the West Pit have encountered ground water at depths of 88 feet AMSL and 211 feet AMSL, respectively, which is above the anticipated floor of the respective pits. As such, it is possible that ground water would enter either or both of the pits during mining operations. However, tests have indicated that the hydraulic conductivity of the bedrock formation is very low, and total ground water inflow has been estimated at only 1.5 gpm for the West Pit and 0.7 gpm for the East Pit. Should ground water be encountered in the pits during mining operations, it would be utilized in dust control operations, or collected and used in process operations.

Since the West Pit would be backfilled with waste rock mined from the East Pit, this would prevent the formation of a pit lake in the filled West Pit. Calculations for the East Pit indicate that the estimated annual evaporation rate is approximately 170 times the annual estimated ground water and precipitation inflow rates, indicating that the formation of a pit lake in the bottom of the East Pit after the cessation of mining activities is not probable. However, Chemgold would conduct an assessment at the end of mining to determine if ground water encountered in the East Pit may enter the pit in sufficient ~~quantity~~ quantities in spite of evaporation to create a pit lake. If this assessment indicates that the formation of a pit lake is sufficiently likely, Chemgold would then place sufficient backfill into the open East Pit to raise the floor of the pit to a level higher than the level of any pit lake which may be eventually predicted to form from the inflow of ground water.

2.1.4. Geochemical Characteristics of Mined Materials

Some types of waste rock, leached ore, or fresh ore can acidify contacting water when exposed to the atmosphere and ground or meteoric water. This ability is characterized as a rock's "acid potential." Generally, rock with a high acid potential contains disseminated sulfide minerals which can react with water and atmospheric oxygen to produce sulfuric acid. The generated acid may then leach potentially toxic metals and other constituents from the waste materials. Other waste rock, leached ore, or fresh ore may be acid-neutralizing under the same conditions. This is a rock's "neutralization potential." Waste rock materials with low acid potential and high neutralizing potential are generally environmentally benign.

Two A waste rock characterization study was conducted

Geochemical ~~rock~~ characterization ~~analyses~~ study were conducted on waste rock and ~~leached~~ ore samples during a waste characterization study from the Project mine and process area to determine whether the ore and waste rock materials would have the potential to be acid generating, and determine the chemical characteristics of the potential leachate ~~generated~~ from these materials under various conditions (EMA, ~~1995~~; see Appendix ~~B~~ C-1 and C-2). The sampling and analyses procedures used to characterize the waste generated from the Project, as described in the following sections, were based on procedures generally accepted by the California Regional Water Quality Control Board, Colorado River Basin Region (CRWQCB) for characterizing mine waste material. spell out

2.1.4.1. ~~Acid Neutralization Potential~~ Static Test Analyses

As part of the Acid Neutralization Potential (ANP) analysis, the total sulfur content of each sample was determined to evaluate its acid potential (AP). The neutralization potential (NP) of each sample was also determined. The ratio of NP:AP is the sample's acid neutralization potential (ANP). Based on these analyses, the potential for the Project waste rock and spent ore material to be acid generating was found to be low to very low. These findings are consistent with observations made by Chemgold geologists that the ore and waste rocks are devoid of sulfide minerals.

2.1.4.2. Geochemical Characteristics

Metal analyses, using total metal and acidic rain water extraction methodologies (the latter using the U.S. Environmental Protection Agency (USEPA) Synthetic Precipitation Leaching Procedure (SPLP) (Method 1312)), were conducted on samples of waste rock and ore material. The SPLP is designed to simulate the concentrations of metals and other compounds which could be leached from waste materials exposed to acidic rainfall. Ore samples were first subjected to leaching by dilute cyanide solution to remove precious metals, then neutralized, to be representative of the

leached ore material which would remain on the heaps following completion of Project activities.

None of the total extracted metal concentrations from the samples exceeded the State of California Total Threshold Concentration Limits (TTLCs) for characteristically toxic hazardous waste for any constituents tested, and most metal concentrations were an order of magnitude or more below the respective TTLC values. Metal concentrations detected in the solution extracted from samples using the SPLP method were all consistently very low.

2.1.5. Waste Rock Stockpiles

~~Four (4)~~ Three (3) waste rock stockpiles are proposed: ~~two (2)~~ one (1) located to the north of the West Pit (the "west" waste rock stockpile); ~~and~~ one (1) to the south of the West Pit (the "south" waste rock stockpile); and one (1) located north of the East Pit (the "east" waste rock stockpile). The waste rock stockpile locations were selected to minimize disturbed acreage, and minimize stockpile height and haulage distance. Up to 450 million tons of waste rock would be mined and placed onto the waste rock stockpiles. As described in Section 2.1.3, most of the waste rock consists of cemented and uncemented alluvial gravels, although some bedrock (Jurassic Age gneiss and minor amounts of Tertiary Age volcanic rock) would also comprise waste rock. No segregation of waste material is planned for the waste rock stockpiles.

The ~~two (2)~~ "west" waste rock stockpiles, located north of the West Pit, would likely be constructed first, followed by construction of the "south" waste rock stockpile, located south of the West Pit. The "east" waste rock stockpile, located north of the East Pit, would likely be constructed last. These waste rock stockpiles would be constructed in successive 50-foot to 100-foot lifts, to a maximum height of 400 feet, and would be engineered to have overall 2 horizontal to 1 vertical (2H:1V) final slopes. The waste rock stockpiles would be developed by end-dumping from the haul trucks, with the active face of each lift lying at the angle of repose of the waste rock (typically 1.5H:1V).

As mining proceeds from the West Pit to the East Pit, waste rock from the East Pit would be placed into the previously mined-out West Pit. Subsequent waste rock would be placed into an open pit whenever access to additional economic mineralized areas is not impeded.

2.1.6. Soil Stockpiles

Soil would be salvaged from the surface of disturbed wash areas within the Project mine and process area for use during reclamation (see Section 2.1.11.3) and would be stockpiled at any one of four (4) proposed sites: one (1) stockpile located to the northeast of the leach pad; two (2) stockpiles located east of the Singer Pit; and one (1) stockpile located to the southwest of the West Pit (see Figure 2-2). In addition, the tops of the ~~northern~~ "west" and "east" waste rock stockpiles would be available for the storage of stockpiled soil. The soil stockpiles would be clearly identified with signs to assure that the material was not misidentified as waste rock material. Erosion control methods would be used to re-route any storm flows around the stockpiles to natural drainages at velocities that would minimize erosion (see Section 2.1.9.7).

2.1.7. Temporary Storage Areas and Construction Sites

The Mineralized Potential Area, and the top surfaces of waste rock stockpiles, would be temporarily utilized for equipment storage, assembly and erection; and for the stockpiling of construction materials and aggregates. These stockpiled materials and aggregates would be hauled from the temporary storage areas to be used by mobile crushing and screening systems which would be brought on the site over the life of the Project to construct the sequential phases of the leach pad facility (see Section 2.1.8).

2.1.8. Ore Processing Facilities

Ore would be processed using conventional heap leach methods. This methodology is currently utilized by Chemgold at its Picacho Mine, located eight (8) miles east of the Project; by other companies at the two (2) mines in the vicinity; and at numerous other mines throughout the western United States. The process involves stacking the ore on engineered, synthetically-lined, impervious pads. The surface of the ore heaps is then wetted with an alkaline solution containing low concentrations of cyanide. This solution percolates through the ore, producing a soluble, precious metal-cyanide complex, known as the "pregnant" solution. The pregnant solution drains through the heap to the pad liner, then flows within a pipe drainage system to the pregnant solution storage pond. The gold/silver-bearing pregnant solution is then pumped from the pregnant pond to the processing facility, where the precious metals are extracted from the solution by way of a carbon adsorption process. The resultant "barren" solution, from which the gold/silver has been removed, then flows to the barren solution storage pond before being pumped back to the heap to begin the cycle again.

The carbon from the adsorption process is stripped of its gold/silver by a stripping solution, from which the gold/silver is then electroplated onto steel wool or stainless steel cathodes. The gold/silver-bearing cathode material is smelted in a furnace with a flux to produce gold/silver "doré." The doré is subsequently refined offsite.

Development of the proposed ore processing facilities would include the construction of a 329-acre heap leach pad, ~~and~~ a lime bin area, and a ~~/~~fresh water pond, the latter two (2) together comprising a total of approximately one (1) additional acre. Associated processing buildings, process solution ponds, and a storm water retention pond would comprise an additional 21 acres (see Figure 2-2 and Table 2-1). The heap leach pad, as well as the collection channels and process ponds, would be designed as lined, zero-discharge facilities with leak detection systems, in conformance with California Code of Regulations (CCR), Title 23, Chapter 15 regulations and the CRWQCB Waste Discharge Requirements (see Section 2.1.8.1, Section 2.1.8.2 and Section 2.1.8.3).

2.1.8.1. Heap Leach Facility

The heap leach facility pad would be designed to hold 150 million tons of ore. The run-of-mine ore would be stacked at an approximate rate of 12 million tons per year over the life of the Project. The leach pad liner facility would be constructed in three (3) to four (4) ~~to five (5)~~ phases as space is required for new ore. A portable crusher and screen plant would be utilized to develop the aggregates for the liner system, which would come from the waste rock mined during normal mining activities. The construction materials would be temporarily stockpiled and then hauled to the liner system for installation. It is anticipated that liner system construction activities would occur once every two (2) to four (4) years.

As part of the leach pad construction, the site to be constructed would be graded to ensure solution drainage from the leach pad to the solution ponds. In addition, the heap benches and berms would be constructed to provide for 100 percent containment of the precipitation from the 1 hour probable maximum precipitation (PMP) design storm event (4.65 inches, which is the average of the 1 hour PMP from El Centro and Yuma) in order to minimize runoff from the heap piles and maximize infiltration of storm water into the heap piles. A service road and containment berm would be constructed around the perimeter of the pad to assure that process solution and rain which falls onto the heap drains to the pregnant solution pond. Interceptor ditches would be constructed to divert upstream surface runoff around the heap leach facilities. A six (6)-foot high, metal, chain-link fence, topped with one (1) foot of barbed wire ("process fence"), would surround the entire leach pad and process area.

The heap leach pad liner would be designed to serve as an engineered alternative to the prescriptive standard for a Group B mining waste, waste pile, as contained in Title 23, Chapter 15 of the CCR, and may be approved, or modified, by the CRWQCB in the Waste Discharge Requirements for the Project. Phase 1 of leach pad construction would consist of a composite of 40-mil PVC primary and ~~30~~ 20-mil PVC secondary geomembrane liners placed directly on four (4) inches of compacted, fine-grained, bedding material. If low permeability clay materials are available, Phases 2 through ~~5~~ 4 of leach pad construction would consist of a composite of 40-mil PVC geomembrane liner overlying twelve (12) inches of compacted, low-permeability clay materials with a maximum permeability of 1 x 10^{-6} cm/sec. If low permeability clay materials are not available, ~~these~~ Phases 2 through ~~5~~ 4 of the leach pad would be constructed similar to Phase 1.

An engineered drain pipe network would be placed on top of the liner system for all ~~five (5)~~ four (4) phases of leach pad construction. Following the placement of one (1) layer of twelve-ounce geofabric above the 40-mil PVC geomembrane liner, a 24-inch layer of minus 1¼-inch screened/crushed, free-draining gravel would be placed on top of the liner system to protect the liner, facilitate the collection and removal of leach solution, and minimize the hydraulic head on the synthetic liner.

A containment berm, with a minimum height of six (6) feet above the outside natural ground elevation, would be constructed around the perimeter of the ore heap. The ore heap would be typically set back eighteen (18) feet from the inside crest of the berm. The leach pad system would be designed such that pregnant solution would drain internally to the central pipe network and into the pregnant solution pond. No solution ditches would be present. A containment berm for the 24-inch solution pipes would be installed along the downhill toe of the leach pad.

It is anticipated that the first lift of run-of-mine ore would be loaded onto the heap leach pad directly over an intervening layer of free-draining gravel. The ore would be loaded onto the pad, without prior crushing, by end-dumping from the haul trucks. Approximately two (2) pounds of lime per ton of ore would be placed onto the trucks at the lime bin location. The ore would be spread and scarified to produce a heap pile with relatively uniform thickness and percolation characteristics.

The proposed heap leach facilities would be constructed in progressive lifts to a maximum height of 300 feet above existing grade. Overall exterior slopes would be 2H:1V, designed for operational stability, decommissioning, and final

reclamation (see Section 2.1.11.2.5 ~~?~~). Barren solution would be applied to the ore using conventional drip emitter irrigation technology. Sprinklers would be used during decommissioning and rinsing of the heaps, and possibly after major storm events to facilitate evaporation of excess water.

Monitoring of the heap for ponding of the cyanide solution and equipment malfunction would be conducted once per shift, seven (7) days per week. Any discovered mechanical malfunction in the emitters, pipelines or other equipment would be repaired immediately. Should any ponding of the cyanide solution on the heap leach be found, the area would be repaired by reducing the number of emitters in the area (thereby reducing solution flow), or by removal of the emitters, scarification of the heap surface under the emitters, and reinstallation of the emitters.

2.1.8.2. Barren, Pregnant and Storm Water Ponds

The barren and pregnant process solution ponds and storm water overflow pond would be constructed immediately down-slope of the leach pad. Leach solution and rain which falls on the heap would drain by gravity through the heap to the liner, then directly to the process ponds. The combined process and overflow ponds have been designed to hold the working volume of solution, and the rainfall run-off from the heap following a maximum probable one-hour storm event occurring simultaneously with a 24-hour power outage, while maintaining a two-foot freeboard. ~~The capacity of the pregnant and barren solution ponds would each be approximately 7.1 million gallons (with a two-foot residual freeboard), for a combined storage capacity of about 14.2 million gallons. The overflow storm water pond would have a capacity of approximately 25.8 million gallons (also with a two-foot residual freeboard), and can be expanded within the projected area of disturbance, if determined to be necessary, to accommodate higher storm flows or increased operational flows.~~ The capacity of the pregnant and barren solution ponds, approximately 10.2 million gallons each, will together be sufficient to store the stormwater runoff (including a two (2)-foot freeboard) for Phase 1 of the leach pad without construction of the overflow pond. The approximately 22.4 million gallon stormwater overflow pond will be constructed during the construction of Phase 2 of the leach pad, and will provide sufficient additional stormwater capacity (including a two (2)-foot freeboard) for both Phase 2 and Phase 3 of the heap leach pad. If Phase 4 of the heap leach pad is constructed, the stormwater pond would be expanded to meet the stormwater runoff requirements for the additional pad space.

All pond liner systems ~~would~~ are currently proposed to consist of an inner ~~60-mil~~ 20-mil thick ~~high density polyethylene (HDPE)~~ polyvinyl chloride (PVC)

liner and an outer ~~60-mil~~ 45-mil thick ~~HDPE~~ (OGR) liner, separated by ~~geofabric~~ geonet on the pond sides and a ~~geonet~~ geotextile layer ~~situated directly below a layer of geofabric~~ on the pond bottom, as may be approved, or modified, by the CRWQCB in the Waste Discharge Requirements which will be issued for the Project. The geonet/geotextile is part of the leachate collection and recovery system (LCRS), which also includes a sump, consisting of select drain fill, placed at the lowest corner of each pond between the geomembrane liners. A leak detection well, consisting of 8-inch diameter, Schedule 80 PVC pipe, would be placed in the sump and "daylighted" at the top of the pond for monitoring any fluid which reached the sump. The well pipe would be screened in the sump material.

The pregnant and barren solution ponds would be constructed with solution pond covers, consisting of small-mesh nets. A solid 40-mil HDPE/polypropylene (PPE) synthetic material or floating HDPE balls may also be used, if determined necessary. Discharge of leach solution and precipitation from the leach pad to the ponds would occur in pipelines within the netted area of the ponds.

2.1.8.3. Vadose Zone and Ground Water Monitoring

A vadose (unsaturated ground water) zone monitoring system would be installed to detect potential leaks in the pad lining system. This vadose zone monitoring system is currently proposed to consist of liquid collection devices installed beneath the liner system. The actual vadose monitoring system installed, and the coverage required, must be approved, and may be modified, by the CRWQCB in the Waste Discharge Requirements for the Project.

A minimum of two (2) ground water monitoring wells would be drilled and completed in the uppermost water bearing zone beneath the pad to intercept the upper 10 feet of ground water. The actual well locations and monitoring depths would be based on: subsurface water levels; the general ground water gradient as it currently exists; future ground water level measurements; and the requirements of the CRWQCB Waste Discharge Requirements when issued. A ground water monitoring program for these wells would be approved by the CRWQCB and implemented by Chemgold to sample and test the ground water passing beneath the leach pad and ponds to detect any leakage from the facilities into the shallow ground water. ~~One~~ Two (2) monitoring wells, one (1) located at the upgradient boundary and one (1) located at the downgradient boundary of the Project mine and process area near the heap, have ~~, has~~ already been installed by Chemgold and quarterly samples of the shallow ground water are being taken. ~~This~~ Either or both of these wells may be accepted by the CRWQCB as one or both of the two (2) or more required monitoring wells.

2.1.9. Support Facilities

Support facilities located within the Project mine and process area would include: office buildings with approximately 7,000 square feet of floor space; a maintenance shop of approximately 20,000 square feet on a reinforced concrete slab; telephone facilities, including a roof-mounted microwave communications antenna; explosives magazines; an ammonium nitrate storage facility; a lime storage facility; chemical storage areas; diesel fuel storage areas; water storage facilities; an emergency electrical power generator; a hazardous waste storage area; equipment wash facilities; a laboratory; roads; and surface flow and erosion control structures. Project support facilities located within the Project ancillary area would include: water supply wells and connecting pipeline; an electrical metering station and electrical powerlines; and the realignments of portions of Indian Pass Road. Project support facilities located outside of the Project area would include a "rebuilt" electrical transmission line.

2.1.9.1. Manpower

Approximately 100 workers may be required to construct the Project facilities; however, only a percentage of these workers would be employed at the Project site at any given time. Contractor personnel would be hired to: construct the leach pad liner systems, ponds, process plant and related facilities; perform civil construction, concrete work, liner installation and quality control; install electrical utilities and communication systems; and complete other miscellaneous tasks. Chemgold employees, possibly from the existing Picacho Mine, would be utilized for: construction management; technical services; pre-stripping the orebodies; earth moving; and facility preparation.

Transitioning from the construction phase to the operating phase would increase the number of workers to as many as 150 full-time employees. Mining and processing operations would be conducted 24 hours per day, 365 days a year. The work force would be predominantly from Imperial County, California and Yuma County, Arizona. It is anticipated that as many as 55 of the current Chemgold Picacho Mine employees would transfer to the Project after the completion of mining at the Picacho Mine. Employment levels for the Project would remain relatively constant for the full Project mine life of up to twenty (20) years. Employees would be encouraged to carpool to the mine site.

2.1.9.2. Water Supply and Distribution System

Development of a water supply system would be required to supply water to the Project sufficient to operate the heap leach and related facilities, and provide water for dust control. Peak water consumption of approximately 1,000 gpm,

averaging approximately 1,200 afy, would be created by the evaporative loss and capillary retention of water in the heaps (approximately 75 percent of the water loss), and by water used for dust suppression, office/domestic use, and construction and reclamation (approximately 25 percent of the water loss). All water used in the processing of the ore not evaporated would be recycled back onto the leach pad.

Chemgold is proposing to develop a ground water well field to provide the Project water requirements. Production of the water would require drilling and completion of up to four (4) water wells within the Project ancillary area (see Figure 2-1). The initial well has been drilled as a ground water exploration well near the intersection of the existing electric transmission line and Indian Pass Road, approximately four (4) miles from the southern boundary of the Project mine and process area. The final number of wells and the specific location of each of the additional wells will be dependent on the results of the testing of each of the wells. However, all wells would be drilled within the Project ancillary area, adjacent to Indian Pass Road, within 1.5 miles of the existing well. The water would be pumped to the surface from a depth of 800 to 1,000 feet below ground surface (bgs) by electrical pumps. The water would be conveyed by buried pipeline from the wells to above-ground water storage and distribution tanks, or to the fresh water storage pond, constructed within the Project mine and process area. Both the buried pipeline, and any required electric power distribution line needed to power each of the well pumps, would be constructed adjacent to the access road to each well.

2.1.9.3. Electric Power Supply and Utilities

2.1.9.3.1. Electrical Power

Peak electrical power requirements for the Project would be approximately 8 MW, which would be supplied ~~by a local~~ from the utility power system. To deliver this power to the Project, an existing 34.5 kV transmission line owned by the local electrical utility, the Imperial Irrigation District (IID), would be "overbuilt" for approximately sixteen (16) miles, from immediately south of Interstate 8 just east of Sidewinder Road to Indian Pass Road near Ogilby Road, with a new 92 kV transmission line, to also be owned by the IID (see Figure 2-5). This new 92 kV/34.5 kV transmission line would be connected to the existing IID 92 kV "C-Line," located immediately south of Interstate 8. At the point where the existing 34.5 kV transmission line crosses Indian Pass Road (approximately 4.5 miles southwest of the Project mine and process area), a new electrical metering station, to be owned by the Project, would be constructed (see Figure 2-5). From the metering station, a new 92 kV

Figure 2-5: Existing and Proposed Transmission Lines

transmission line, also owned by the Project, would be built adjacent to the south side of Indian Pass Road to a mine substation located within the Project mine and process area (see Figure 2-5). The new 92 kV/7.2 kV substation would be constructed to transform the electrical power to the 7.2 kV voltage used by the Project. A 7.2 kV distribution line would be "underbuilt" on the same poles as the new 92 kV transmission line running adjacent to Indian Pass Road to provide power as necessary to the ground water well pumps located adjacent to Indian Pass Road in the Project ancillary area.

Emergency power requirements for essential loads and services for the Project during periods of utility service interruption would be provided by a ≥500 kW, diesel-powered, electric generator located near the processing facility in the Project mine and process area.

The metering station would be built within a fenced area approximately 25 feet by 50 feet located southeast of the intersection of the existing 34.5 kV transmission line and Indian Pass Road. The mine substation would be enclosed within a similarly sized fenced area among the Project facilities located near the northwest corner of the heap leach pad.

"Overbuilding" the existing 34.5 kV transmission line would consists of: (1) tilting the existing wooden poles to the side to move the electrical conductors out of the current transmission line alignment; (2) installing new, taller, wooden poles ~~immediately adjacent to the existing wooden poles~~ in the same transmission line alignment; (3) installing the new 92 kV conductors near the top of the new poles; (4) moving the existing 34.5 kV conductors from the existing poles to below the 92 kV conductors on the new poles; and (5) then removing the existing poles.

The 92 kV/34.5 kV transmission line would be constructed within the 20-foot wide right-of-way granted by the BLM and the easements obtained from the private landowners near Interstate 8 for the existing 34.5 kV transmission line. Construction access would be from the existing transmission line access road, which roughly parallels the entire length of the transmission line. To tilt and remove the existing poles, the short trails from the access road to each existing pole and the areas around each existing pole which were disturbed when the transmission line was originally installed in the 1960's will be redisturbed. However, spacing of the new poles may be reduced to approximately 300 feet from the existing pole spacing of approximately 400 feet, which would require the disturbance of short trails from the existing access road to each new pole, and disturbance of an area around each new pole, during the construction process. Additional surface

disturbance will also occur when the existing and new conductors are "pulled" from cable pulling stations, and from equipment laydown areas to be established at each end of the transmission line. ~~The existing access road and previously disturbed pole trails and cable pulling stations would be used to install the new poles and string the new conductors. Thus, no new surface disturbance is anticipated during construction or operation of the overbuilt transmission line, although construction would redisturb those areas which had been previously disturbed by the original construction of the transmission line in the 1960's. The 92 kV transmission line would be constructed within the 20± foot wide right-of-way granted for the existing 34.5 kV transmission line.~~

Assuming an average of 50 feet of 10-foot wide pole trail and a 20-foot by 50-foot area of disturbance for each of the approximately 210 existing poles, a total of approximately seven (7) acres of previously disturbed land would be redisturbed during the "overbuilding" of the transmission line. A total of up to ten (10) additional acres would be disturbed for installation of approximately 280 new poles if new poles were spaced at 300-foot intervals and none were installed in the same locations as existing poles. An approximately 100-foot square area would be disturbed for each of the estimated nine (9) cable pulling stations (about one (1) for every two (2) miles of transmission line), which would result in disturbance to approximately two (2) acres. Laydown areas would disturb approximately an additional two (2) acres. Total disturbance during construction of the "overbuilt" 92 kV/34.5 kV transmission line would be approximately 21 acres.

2.1.9.3.2. Telephone Service

Telephone service would be provided to the offices and maintenance shop by a microwave system located within the Project mine and process area. Field communications would be provided by an FM mine communication system.

2.1.9.4. Chemical Use and Storage

Numerous chemicals would typically be stored at, and used by, the Project (see Appendix ~~C~~ A for a complete list of chemicals stored and used). These can be generally categorized as heap leach processing chemicals; mine chemicals/explosives; maintenance facility/power generation chemicals; and laboratory chemicals. Miscellaneous laboratory chemicals would be maintained in small quantities only and kept in containers in the on-site laboratory. Most of the bulk chemicals would be stored in closed, weather-proof containers in secured,

open-air storage areas. All chemicals would be stored in conformance with local, state and federal regulations and company safety policies.

Heap Leach Processing Chemicals:

The principal heap leach processing chemical, sodium cyanide, may be received either dry or as a liquid. Liquid cyanide would be off-loaded from the manufacturer's specially-designed trucks into one (1) of two (2)~~,~~ 20,000-gallon storage tanks at a concentration of about 30 percent cyanide and a pH of about 13. Dry cyanide would be shipped~~,~~ and received ~~and stored~~ in the manufacturer's dry bulk trucks ~~3,000 pound net capacity flow bins~~. Solid sodium cyanide would be put into solution directly from the ~~flow bins~~ flow trucks and also stored at a concentration of about 30 percent cyanide and a pH of about 13 in one (1) of the two (2) storage tanks. All cyanide would be stored within the lined Project process area, surrounded by a security fence. Sodium cyanide solution would be metered directly into the barren solution in the pipes leaving the barren solution pond for application to the heap. The cyanide concentration of the barren solution applied to the heap would be maintained at the desired 200 to 350 ppm for effective leaching of the ore. Similar cyanide handling practices are currently utilized at Chemgold's Picacho Mine, and are standard in the precious metal processing industry. Annual sodium cyanide usage is anticipated to be approximately 1,750 tons.

Other heap leach processing chemicals (including sodium hydroxide (for cyanide solution pH control), hydrochloric acid (for carbon cleansing), and carbon (for removing precious metals from the pregnant solution) would be stored in secured, hazardous materials storage yards near the process facility. Acids would never be stored near cyanide. Calcium oxide (lime), which would likely be added directly to each haul truck prior to loading the ore on the heap leach pad, would be stored in silos on the north end of the heap leach loading ramp. Anti-scalants (principally polymaleic acid) would be stored adjacent to the process ponds. Calcium hypochlorite [$Ca(ClO)_2 \bullet 4H_2O$] would be kept on site to neutralize any small spills of liquid NaCN. Annual usage of these chemicals is estimated at 150 tons for sodium hydroxide; 212 tons for hydrochloric acid; 130 tons for carbon; 16,500 tons for lime; and 150 tons for polymaleic acid.

Mine Chemicals/Explosives:

The mine chemicals/blasting agents and associated explosives which are necessary for mining operations would be stored in magazines in compliance with U.S. Bureau of Alcohol, Tobacco and Firearms (ATF), and Mine Safety and Health Administration (MSHA), safety standards. The ammonium nitrate used in

blasting would be stored in bulk in silos. Annual consumption of the bulk ammonium nitrate would be approximately 7,500 tons.

Maintenance Facility/Power Generation Chemicals:

The maintenance facility/power generation chemicals stored and used in the greatest quantities are diesel fuel, unleaded gasoline, and motor oil, all of which are stored in above-ground tanks located within a containment structure located next to the maintenance shop. Annual consumption of gasoline is estimated at approximately 40,000 gallons, and annual lubricant consumption is estimated at 31,000 gallons. Annual diesel fuel consumption for blasting and fueling on-site equipment and use in the emergency generator is estimated at 4 million gallons.

2.1.9.5. Waste Disposal

Septic treatment systems with leach drain fields would be installed near the office and shop facility, adjacent to the processing and laboratory facilities, and adjacent to the lime storage facility. Chemgold would contract with local disposal service companies for the pumping of septic tanks and the removal of other (non-mining) waste from the Project area for disposal in an approved landfill. Regulated wastes, such as used antifreeze, spent solvents, batteries, and used oils and oil filters, would be transported offsite by a company authorized to recycle these regulated wastes. These wastes would be recycled or disposed of in conformance with all applicable local, state and federal laws and regulations, and in a manner approved by the responsible regulatory agencies.

Major maintenance of equipment would be conducted within the concrete-paved and bermed areas of the maintenance yard to the extent possible to minimize accidental discharges of waste lubricants and other materials to the ground. All mining equipment would be equipped with the "EVAC" servicing system, which allows quick, "leak-free" lubricant servicing from mobile and stationary servicing equipment.

2.1.9.6. Roads

Haul roads constructed to haul mined material within the Project mine and process area would typically be approximately 100 feet wide, although in some areas would be as much as 150 feet wide to allow for surface drainage areas and separate lanes for support vehicle traffic. Service or maintenance roads within the Project mine and process area would be approximately 30 feet wide. A service road would be constructed inside the perimeter fence around the perimeter of the Project mine and process area to provide access for maintenance and security; in

some locations, this perimeter road would be coincident with constructed haul roads.

Access to the Project would be from Ogilby Road, a county-maintained two-lane paved road, via Indian Pass Road, a county-maintained gravel road (see Figure 2-6). Project traffic on Ogilby and Indian Pass Roads is estimated at approximately 47 lightweight vehicle round trips per day during normal operations. Heavy truck traffic is estimated at approximately 3.5 round trips per day.

Small numbers of light vehicles may also occasionally access the Project area from Chemgold's Picacho Mine, located eight (8) miles to the east of the Project area, via BLM Route A278, Hyduke Road. Neither Hyduke Road nor the BLM open routes of travel in the vicinity of the Project mine and process area would be used for heavy truck or equipment traffic. Occasional use of Hyduke Road by lightweight vehicles would continue until final closure and reclamation of the Picacho Mine.

The approximately 6,000-foot section of Indian Pass Road located within the Project mine and process area would be relocated prior to mining the West Pit, as the pit would occupy the road's current location (see Figure 2-4). Figure 2-2 shows the proposed relocation of Indian Pass Road, which would shift the road approximately 1,000 feet to the west of its current location to allow continued public access to areas north of the Project. Construction of the realigned section of Indian Pass Road would begin immediately following receipt of approvals to proceed with the Project and would require approximately two (2) months to complete. Indian Pass Road would be maintained open to the public during construction of the relocated portion.

After completion of mining at the West Pit, waste rock stripped from the sequential mining of the East Pit would be placed in the mined-out West Pit. Should sufficient waste rock be subsequently produced to allow for backfilling of the mined-out West Pit, Indian Pass Road would be returned to a location east of and approximately parallel to the diverted west drainage channel ~~its current location~~, and the area disturbed by the relocated segment of Indian Pass Road ~~realigned road segment~~ would be regraded and reclaimed (see Figure 2-4).

The intersection of Indian Pass Road and Ogilby Road would also be realigned to have Indian Pass Road meet Ogilby Road at a right angle, rather than the acute angle which the intersection now has. This would be accomplished by constructing a new intersection approximately 330 feet south of the current intersection of Ogilby Road and Indian Pass Road, and connecting the current

Figure 2-6: Access Roads and Open Routes of Travel

alignment of Indian Pass Road with this new intersection through an approximately 60° turn with a radius of approximately 105 feet. The abandoned section of Indian Pass Road would be regraded and reclaimed (see Section 2.1.11.2).

If acceptable to Imperial County, Chemgold plans to post signs on Indian Pass Road at the intersection with Ogilby Road warning drivers that the maintained road ends in 3.5 miles (prior to the Project mine and process area). Signs would also be posted at the two (2) wash crossings along the relocated portion of Indian Pass Road warning drivers not to cross the wash when flooded. Chemgold would undertake emergency repairs or maintenance, as may be necessary and authorized by Imperial County, if Indian Pass Road is damaged by flooding where it crosses existing ephemeral stream channels. Water and/or an environmentally acceptable chemical dust inhibitor such as sodium lignosulfonate (a non-toxic non-hazardous, co-product of cellulose produced from trees), would be applied to Indian Pass Road from its intersection with Ogilby Road to the boundary of the Project mine and process area. Chemgold plans no other alterations to Indian Pass Road to accommodate mine-related traffic.

As part of Chemgold's operations, water sprays and/or chemical treatments would be used to minimize the generation of dust from disturbed surfaces within the Project mine and process area. Water, and/or an environmentally acceptable chemical dust inhibitor, would be applied to the haulage and other roads in sufficient quantities to minimize significant dust emissions. Water would generally be applied on those roads used only temporarily, while the chemical dust inhibitor would be periodically applied to the more ~~well-~~heavily traveled areas.

2.1.9.7. Surface Flow Diversions

All surface drainages in the area are ephemeral, with flows occurring only during, and immediately following, major precipitation events. Several ephemeral drainages must be either temporarily or permanently diverted around the facilities located within the Project mine and process area. Each of the diversion channels has been designed to safely convey all runoff flows from the 100-year, 24-hour precipitation event, and to direct water back into the same major drainage system from which it was diverted (see Figure 2-7).

The largest diversion ~~temporarily~~ permanently routes the westernmost Project mine and process area wash around the West Pit. This diversion channel would be built to approximate the original drainage system in both gradient and channel geometry (see Figure 2-8). During the period that the West Pit is open, this ~~This~~

Figure 2-7: Diversions of Washes Within the Project Mine and Process Area

Figure 2-8: Cross-Section of West Wash Diversion Channel

~~temporary~~ diversion channel may be temporarily lined with high density plastic or clay protected by rip-rap to prevent subsurface flows into the open pit. Additionally, any ~~Any~~ areas which might be especially susceptible to erosion from ~~resultant~~ surface flows are to be bermed and/or rip-rapped to prevent erosion and potential damage during the period when the West Pit is open ~~temporary period of diversion (see Figure 2-8)~~. Once the West Pit has been backfilled (see Section 2.1.3), ~~a new channel would be constructed in approximately the same location of the original wash and the wash permanently returned to this channel (see Figure 2-4)~~ any rip rap or temporary plastic liners installed in the diversion channel ~~would be~~ removed and the channel regraded. ~~This permanent channel would be built to approximate the original drainage system, and~~ Once the channel has been completed without liners or rip rap, the channel slopes and banks would be selectively planted with young ironwood and palo verde trees or seedlings to begin to reestablish microphyll woodland habitat similar to that removed by excavation of the original stream channel (see Section 2.1.11.3).

may

Three (3) smaller diversion channels would also be constructed to divert storm waters from existing washes around Project facilities (see Figure 2-7). The easternmost diversion channel would be constructed to permanently divert water around the eastern edge of the East Pit and the "east" ~~north~~ waste rock stockpile. The two (2) other diversion channels, which divert the upstream portions of two (2) stems of the central wash around the Singer Pit and within the Mineralized Potential Area, may be relocated and constructed one (1) or more times during the life of mining operations to provide for mining and backfilling of sequential open-pit phases before being permanently constructed. However, in each case, all diversion channels would channel surface flows into other existing nearby drainages which flow back into the same major wash system within the Project mine and process area and would be built to approximate the original drainage system in both gradient and channel geometry.

~~Energy dissipators would be constructed at the end of the channels as necessary to minimize the potential of erosion from the diverted run-off.~~ Temporary diversion channels may be lined and/or rip-rapped to minimize the potential for subsurface leakage into the adjacent open pits. Permanent diversion channels would not be lined or rip-rapped, and permanent channel slopes and banks would be selectively planted with young ironwood and palo verde trees or seedlings to begin to reestablish microphyll woodland habitat (see Section 2.1.11.3).

2.1.9.8. Fences

Prior to the initiation of operations, fencing would be installed around Project facilities to protect the public and wildlife. A 3-strand, 4-foot high, smooth-wire fence would be erected along the entire Project mine and process area boundary, and the southern portion of the central drainage, except as noted below. Along the entire western boundary of ~~in the northwest corner of~~ the Project mine and process area, generally along the boundary adjacent to Indian Pass Road, a 6-foot high chain link fence would be constructed ~~where the fence would be located on the south side of the Indian Pass Road realignment~~ (see Figure 2-2). In addition, those portions of the Project mine and process area boundary coincident with the ore leach pad or process facilities would be fenced with six (6)-foot high, metal, chain-link fencing topped with one (1) foot of barbed wire (see Figure 2-2). In areas where the fence crosses an ephemeral stream channel, the fence would be designed to minimize damage during storm events. These sections of fence would be inspected immediately following a flow event and appropriate repairs undertaken in the event that the fence is damaged to prevent public or wildlife access to the Project mine and process area.

Tortoise-exclusion fencing would be installed coincident with the ~~smooth-wire~~ entire perimeter fence. The tortoise-exclusion fence would consist of 1.5 feet of 0.5-inch mesh hardware cloth above the ground surface. An additional one (1) foot of the mesh would either be buried below ground level, or bent at a right angle towards the outside of the fence and covered with gravel and rocks to prevent animals from burrowing under the fence. The uppermost portion of the hardware cloth would extend not more than two (2) inches above the lowermost wire strand. T-posts, or other suitable anchoring posts, would be placed at appropriate intervals (usually 10- to 16-foot spacing).

The entire ore leach pad~~,~~ and process facilities, and the fresh water pond, would be fenced with 6-foot high, metal, chain-link fencing topped with one (1) foot of barbed wire (see Figure 2-2).

Signs would be posted on the perimeter fence at any locations which could pose a threat to public safety, as required by regulation. Fencing would be maintained until the completion of reclamation activities or until the fence is no longer necessary.

2.1.10. Exploration

Continuing exploration activities are planned for the Project area. These exploration activities may include geophysical surveying, geochemical sampling, mapping, drilling and bulk sampling. The exploration drilling would occur only in the Project mine and process area, and be concentrated within and adjacent to the proposed open-pit areas~~,~~ and in the Mineralized Potential Area. Any exploration proposed outside of the Project mine and process area would be conducted under a additional Plan of Operation and Reclamation Plan.

Exploration drill roads and pads would be constructed in a manner that allows the equipment and personnel to access the exploration target areas without unnecessary soil and vegetation disturbance. Existing roads would be used if they provided the needed access. Exploration holes would be drilled using either reverse-circulation or core-drilling methods. Large diameter holes would be drilled for metallurgical samples. The drilling equipment would be serviced by a water truck/pipe truck/crane truck.

Water requirements for exploration activities would be supplied by Chemgold's proposed water supply system. Existing access roads and trails would be used to the greatest extent possible to minimize additional surface disturbance. All exploration drill holes would be plugged in accordance with applicable state law.

2.1.11. Proposed Reclamation

The Reclamation Plan prepared by Chemgold for the Imperial Project is provided as Appendix ~~C~~ A to this joint EIS/EIR.

2.1.11.1. Reclamation Goals

Chemgold has proposed to conduct reclamation activities in accordance with SMARA and the regulations found at 43 CFR 3809.1-3(d) and 14 CCR 3500. In general, the proposed Reclamation Plan includes measures for: protecting wildlife and the public; minimizing erosion and mass failure potential; demolishing structures and neutralizing process components; regrading selected side and cut-and-fill slopes; revegetation; and, where feasible, providing for the resumption of pre-mining land uses.

The proposed post-mining reclamation goals are to: reclaim the site to a stable, functioning landscape unit/ecosystem to allow for similar land uses as currently exist; establish conditions that would promote the long-term development of a vegetation community typical of the local area; and produce

reclaimed areas that are visually and functionally compatible with the surrounding topography. Implementation of the proposed Reclamation Plan would not limit the future development of mineral resources in the area, although some mineralization may be concealed after placement of waste rock in some open pits. Currently uneconomic precious metal resources within the walls and floors of the East Pit and the Singer Pit would remain largely accessible for future development. In addition, material in the waste rock stockpiles would be available for future development.

The Reclamation Plan relies primarily on natural processes and requires little intervention once site preparation is complete. Reclamation procedures proposed incorporate six (6) basic components:

- Establishment of a stable topographic surface and drainage conditions that are compatible with the surrounding landscape and serve to control erosion, including backfilling the open pit sufficient to raise the floor of the pit above the projected level of any pit lake if, at the end of mining, there is sufficient indication that ground water encountered in the open pit would create a pit lake.

- Establishment, where possible on waste rock stockpile tops, haul roads, pit bottoms, and facilities, of soil conditions conducive to a stable plant community through grading and reapplication of suitable growth material containing seeds.

- Revegetation of disturbed areas using native plant species endemic to the area in order to establish a long-term productive biotic community compatible with proposed post-mining land uses and capable of self-regeneration without long-term dependency on maintenance, soil amendments, or fertilizers, including:

  - Planting young ironwood and palo verde trees or seedlings along the channels which divert the throughgoing washes to test the reestablishment of the microphyll woodland habitat in acreage roughly equivalent to that acreage currently found along these channels within the Project mine and process area;

  - Adding seeds of the California Native Plant Society (CNPS)-listed, but locally common, endemic fairy duster (*Calliandra eriophylla*) and winged forget-me-not (*Cryptantha holoptera*) to the revegetation seed mix; and

  - Supplementing the existing natural revegetation seed mix with endemic species which provide additional browse for deer.

- Providing for public safety through stabilization, removal, and/or berming/barricading of structures or land forms that could constitute a public hazard.

- Minimization of the outward regrading or reshaping of slopes in order to reduce further impacts to undisturbed wildlife habitat.

- Enhancement of the long-term visual character of the reclaimed area.

The reclamation effort would consist of different methods to be applied, as appropriate, to reclaim different types of surface disturbance (see Table 2-3). Methods described in the table are further defined below:

Structure Demolition Facility Removal:	Demolition and removal of all building and structures within the Project area;
Neutralization:	Rinsing and neutralization of residual leach solution in the solution ponds and heap;
Backfilling:	Backfilling of selected pits;
Vehicle Access Rock Barricade:	Construction of rock barricades and posting of signs to exclude vehicle access;
Stable Slopes:	Design and construction of stable slopes on the heap; waste rock stockpiles, and pits;

Table 2-3: Reclamation Methods to be Applied to Areas Disturbed Within the Mine and Process Area

MINE FACILITY COMPONENT		RECLAMATION METHODS TO BE APPLIED								
		STRUCTURE DEMOLITION FACILITY REMOVAL	NEUTRALIZATION	BACKFILLING	VEHICLE ACCESS ROCK BARRICADE	STABLE SLOPES	REGRADING	SURFACE PREPARATION	REVEGETATION	NATURAL REVEGETATION
Mine and Process Area										
Pits	West Pit (see also Waste Rock Stockpiles)			X			X	X	X	
	Other Pits-Bottom							X	X	
	Other Pits-Slopes				X	X				X
Process Facilities	Heap Leach Pad-Top		X				X	X	X	
	Heap Leach Pad-Slopes		X				X	X	X	
	Process Facility Area (Solution Ponds and Process Facilities)	X	X				X	X	X	
	Lime Bin Area and Fresh Water Pond	X					X	X	X	
Waste Rock Stockpiles	Waste Rock Stockpiles-Top						X	X	X	
	Waste Rock Stockpiles-Slopes					X				X
Soil Stockpiles	Soil Stockpiles						X	X	X	
Support Facilities	Office/Maintenance/Parking/Emergency Power Area	X					X	X	X	
	Haul and Maintenance Roads						X	X	X	
	~~West Drainage Diversion-Temporary~~	~~X~~					~~X~~	~~X~~	~~X~~	
	~~West Drainage Diversion-Permanent~~						~~X~~		~~X~~	~~X~~
	Other Drainage Diversions-Permanent						X		X	X
Ancillary Area										
County Road Realignment-Temporary							X	X	X	
Powerline, Water Wells		X					X	X		X
Pipeline Route							X	X		X

Regrading:	Rough regrading of disturbed surface areas;
Surface Preparation:	Preparing surfaces through fine grading, ripping to loosen soil, topsoiling, and/or construction of water catchment basins;
Revegetation:	Reseeding and revegetation of disturbed surfaces; and
Natural Revegetation:	Enhancing disturbed surfaces for revegetation by natural means.

Figure 2-9 shows which areas of the Project mine and process area ~~which~~ would be subject to the specific reclamation methods outlined above.

2.1.11.2. Reclamation Activities

Reclamation activities would include: backfilling of selected pit(s) and regrading of disturbed areas; design and construction of stable slopes; reestablishment of drainages and implementation of erosion control procedures; demolition of structures and removal of facilities; and rinsing and neutralization of residual leach solution in the solution ponds and heap.

Concurrent Reclamation:

Reclamation of Project facilities would be initiated concurrent with continuing mining operations (concurrent reclamation) when individual components are no longer required for mine operations or when facilities are decommissioned. Removal of facilities, rough grading, and scarifying activities may occur at any time during the Project life. As operations progress, areas no longer needed for mining activities would be available for concurrent reclamation. Planned concurrent reclamation would focus on the stable diversion of surface water, as well as the stabilization of new or upgraded access roads, side and cut-and-fill slopes, solution pond berms, final waste rock stockpile benches and bare areas around buildings. The interim reclamation of soil stockpiles would consist of grading for stabilization and allowing natural revegetation from seed sources in the stockpile. Exploration roads would be reclaimed concurrent with mining operations when it is determined that the roads are no longer needed for exploration or mining operations. During active mining, concurrent reclamation in and around the pits would primarily be limited to controlling erosion of the

Figure 2-9: Reclamation ~~Levels~~ Methods Applied Within the Mine and Process Area

haul roads and slopes.

Closure and Post-Closure Reclamation:

Closure and post-closure reclamation would commence when the ore reserves are exhausted and mining has ceased. Leaching operations would cease after uneconomic recovery rates are reached. It is foreseeable that the heap leaching activities would remain active after mining activities have stopped, due to the length of time required to complete leach cycles. In this case, open pit and some related facility reclamation and closure activities would occur in advance of leach pad reclamation and closure.

It is estimated that the closure and post-closure phase of reclamation would take one (1) to three (3) years to complete following cessation of mining. Post-closure monitoring of revegetation success, and implementation of post-closure erosion control procedures, are expected to account for an additional three (3) years.

2.1.11.2.1. Backfilling and Grading

Waste rock and overburden would be placed on waste rock stockpiles adjacent to the pits or, as mining proceeds from one pit to the next, into previously mined-out open pits. The West Pit would be entirely backfilled. Subsequent backfill may then be placed into other open pits whenever access to additional economic mineralization is not impeded, or as may be necessary to raise the floor of the East Pit to a level higher than the level of any pit lake which may be eventually predicted to form from the inflow of ground water. If unanticipated circumstances arose necessitating a cessation of mining activities, no post-mining placement of waste rock in the pits would be conducted except as may be necessary to raise the floor of the pit above the predicted level of any pit lake which may be formed from the inflow of ground water.

During active mining, reclamation in and around the open pits may be limited to controlling erosion of the haul roads and slopes. Upon the completion of mining and any appropriate or necessary backfilling, the bottoms of the remaining open pits would be reclaimed by regrading (and revegetating) the haul roads and floors and leaving the slopes in a stable condition. Stable angles of the final pit highwalls would be determined by engineering analysis prior to final closure to ensure that no adjacent drainage diverts into an open pit due to failure of the wall.

All disturbed areas except the pit slopes and the waste rock stockpiles would be regraded, when no longer required for mine operations, as appropriate to create undulating land forms that are stable, do not allow for extensive pooling or ponding, and blend with the surrounding undisturbed topography. Final regrading on the tops and accessible slopes of the waste rock stockpiles and the leach pad, the bottoms of the open pits, and soil stockpiles would be conducted to minimize erosion potential and additional surface disturbance and facilitate the establishment of post-mining vegetation. Sharp edges would be rounded and straight lines altered to provide contours which are visually and functionally compatible with the surrounding terrain. In addition, regrading would entail the creation of water catchment basins to facilitate the revegetation of the disturbed areas. Regrading of other areas disturbed by facilities, roads, and the temporary stream diversions would be fine graded to enhance moisture for reclamation and revegetation.

2.1.11.2.2. Stable Slopes

Stable topographic surface and drainage conditions would be established that would control erosion, prevent sedimentation, and are compatible with the surrounding landscape. Slopes would depend on the type of material, erodability, and the practical considerations of the mining process. Overall slope grades would range from: 1H:1.2V (50 degrees) or steeper for the pit walls; 2H:1V (30 degrees) for waste rock stockpile slopes; 2H:1V (30 degrees) for leach pad slopes; and near-flat along the tops of waste rock stockpiles, the heap, haul and maintenance roads, and pit bottoms.

Pit wall slopes would be constructed during mining at angles consistent with long-term stability. Engineering analysis and Chemgold's experience at the Picacho Mine indicates that the slope of the ultimate pit walls would be 40 to 50 degrees to provide the required factor of safety for long-term slope stability. Each pit is to be developed in separate phases, which allows verification of slope stability parameters by subsequent engineering analysis during operations. Pit walls would have safety benches at regular vertical intervals to contain minor rock spills. Pit wall slopes may increase if actual mining conditions and geotechnical factors indicate that pit wall integrity could sustain steeper slopes. After closure, pit highwalls remaining in areas not utilized for waste rock stockpiling would be left in a stable configuration, subject to natural processes, and barricaded with boulders around the rim of the pit(s) to discourage access by the public and terrestrial wildlife over slopes which could constitute a hazard.

Upon final mine closure, the tops of the waste rock stockpiles would be rough-graded and ripped to prevent water pooling, ponding, and erosion, and to create water catchment basins to facilitate the revegetation of the disturbed areas. Stockpiled soil material would be distributed on the tops and the accessible level portions of the waste rock stockpile slopes prior to broadcast seeding with the proposed seed mixtures.

The sharp contours of the top and bottom of the leach pad would be rounded and softened, and the graded material extended outward far enough to overlap the perimeter berm that encircles the leach pad during active operations. Grading of the pad would leave in place the interceptor ditch around the pad, thereby diverting all runoff away from the pad area. Upon final mine closure, the top and slopes of the leach pad would be rough-graded and ripped to prevent water pooling, ponding, and erosion, and to create water catchment basins to facilitate the revegetation of the disturbed areas. Stockpiled soil material may be distributed on the top of the leach pad prior to broadcast seeding with the seed mixtures.

2.1.11.2.3. Drainage Reestablishment and Erosion Control

All surface drainages in the area are ephemeral, with flows occurring only during and following major precipitation events. Those sections of these existing washes which could convey storm waters around or through the Project mine and process area without impacting Project facilities would not be altered by the Project and would continue to carry storm flows through and around the Project mine and process area. However, several of these ephemeral drainages must be either temporarily or permanently diverted around the facilities located within the Project mine and process area. Each of the diversions has been designed to direct water back into the same major drainage system from which it was diverted. At no time would flows be diverted into other major drainage systems.

~~Energy dissipators would be constructed at the end of the channels as necessary to minimize the potential of erosion from the diverted run-off.~~ Permanent diversion channels would not be lined or rip-rapped, and upon completion of mining operations, any plastic liners installed in the temporary diversion channels would be removed and the temporary channels regraded and revegetated as appropriate. Permanent channel slopes and banks would be selectively planted with young ironwood and palo verde trees or seedlings to begin to reestablish microphyll woodland habitat.

To minimize erosion and the production of sediment, all channels, and adjacent streambank vegetation which is not to be directly impacted by the construction of Project facilities, would be left intact and protected from incidental disturbance from mine activities within the Project mine and process area. To minimize impacts from erosion on the Project area and down surface-gradient areas, all mine facilities, such as the heap leach facility, waste rock stockpiles, soil stockpiles, and roads, would be designed and constructed with appropriate erosion control features. Erosion control features would be designed to meet the performance standards of 14 CCR 3706. Additionally, in accordance with the Storm Water NPDES General Permit requirements, Chemgold will prepare and implement a Storm Water Pollution Prevention Plan (SWPPP), which is a site-specific plan to control drainage and erosion. Surface runoff and drainage from disturbed areas within the Project mine and process area would be controlled, collected, conveyed to sediment basins, and infiltrated (or consumed in mining or the heap leach process).

Methods to be employed, if necessary, to reduce or prevent the generation of sediment from within the Project mine and process area would include berms, sediment ponds, rip-rap, check-dams composed of straw bales, sand bags, silt fences, or other temporary techniques to minimize impacts. All surface runoff generated from disturbed areas within the Project mine and process area would be collected in the active pit(s), collected in the heap leach system and added to the process solution volume, or collected and directed to sedimentation basins for infiltration. No runoff from disturbed areas within the Project mine and process area would be directed into the existing drainage system. Erosion control methods would be designed to handle a twenty (20)-year/one (1)-hour intensity storm event, in accordance with standards established by 14 CCR 3706(d) (SMARA regulations).

2.1.11.2.4. Structure Demolition and Facility Removal

Fencing constructed for the Project operations would be maintained in-place until revegetation is completed and determined successful for bond release by the BLM and Imperial County. At that time, fencing would be removed.

The main haul road, all other Chemgold links in the road network around the mine, and all remaining exploration roads would be regraded, scarified, and revegetated. The relocated section of Indian Pass Road would be reconstructed ~~near its original position~~ adjacent and parallel to the diverted

west drainage channel following the completion of backfilling of the West Pit, and the realigned road segment regraded and reclaimed.

Buildings and ancillary facilities would be reclaimed by having all portable and salvageable structures removed and taken off-site. Any permanent below-grade structures and all building foundations would be buried. All surplus materials, storage containers and trash would be transported to a landfill authorized to accept this material. The remaining surplus waste products, and all fuel oil and similar materials, would be removed from the site and disposed of according to then-current state and federal regulations.

The on-site electric substation, the portion of the 92/~~7.5~~ 7.2 kV transmission line owned by Chemgold which would run from the existing Imperial Irrigation District (IID) 34.5 kV transmission line to the Project mine and process area, and the electric metering station would be removed. The remaining overbuilt 92 kV/34.5 kV transmission line, owned by the IID, would remain in place.

Ground water production and monitoring wells would be plugged and abandoned in conformance with applicable regulatory requirements (14 CCR 3713(a)). The buried ground water pipeline would be abandoned in-place.

2.1.11.2.5. Contaminant Control

The leach pad and process ponds would be designed as lined, zero-discharge facilities with leak detection systems, in conformance with CRWQCB requirements. The process ponds, and storm water overflow pond, would be designed with sufficient capacity to contain the normal operating volume of solution, and the rainfall run-off from the heap following a maximum probable one (1)-hour storm event occurring simultaneously with a 24-hour power outage, while maintaining a two (2)-foot freeboard. Process chemicals would be stored in secured areas in weather-proof containers, in accordance with local, state and federal regulations and company safety policies.

At completion of mining, the spent ore on the heap leach pad would be neutralized, regraded, and seeded as appropriate~~ in accordance with the Level Three guideline~~. Neutralization of the heap leach pile would be accomplished by rinsing with water to reduce cyanide levels to meet the requirements of the Waste Discharge Order Requirements (to be issued by the CRWQCB before use of the leach facility can commence). A neutralizing agent may be added

to the process waters and rinse solutions to reduce the cyanide level to meet CRWQCB standards. Sampling and laboratory testing would be conducted to evaluate and verify completion of the neutralization process at the conclusion of heap rinsing. This would likely require twelve (12) months of rinsing (based on Chemgold's experience to date with successful closing of three (3) heaps at the Picacho Mine).

All neutralized process waters and rinse solutions would be evaporated in the ponds or by sprinklers on the heaps, or land applied. Process water ponds would then be reclaimed, but the final neutralization and reclamation of the ponds would not occur until the neutralization of the heaps is complete to the satisfaction of the CRWQCB. All fencing would be removed and the pond areas graded to blend with the surrounding topography.

Any soil material contaminated by spills of regulated waste materials, such as fuel oil, waste lubricants or gasoline, would be collected, contained, and either remediated on the site (if permissible under then-current regulations) or removed from the site and disposed of in conformance with then-current regulations.

2.1.11.3. Revegetation Activities

Revegetation activities would include: salvaging and stockpiling of available soil; contouring and shaping accessible disturbed areas; revegetation test plots; reapplying soil materials as necessary; preparing seedbeds; seeding and transplanting; optimizing seed mixtures and rates by using locally collected seed; and monitoring and reporting. To aid in the revegetation of the Project area, the naturally vegetated areas between the disturbed areas, such as between roads and pits and the preserved portion of the central wash, would be managed as undisturbed buffers to serve as natural seed sources and provide protection for small mammals, birds, and reptiles.

2.1.11.3.1. Soil Salvage and Stockpile

Most of the Project mine and process area is located on old piedmont surfaces consisting principally of desert pavement which has a poorly developed soil profile and which is not suitable for salvage and use in reclamation. However, a few areas within the Project mine and process area, principally in the shallow washes and adjacent slopes, have shallow soils with suitable texture which can be salvaged. Stripping of these soils to the greatest depth practicable (generally 12-18 inches) would lead to the salvage of an

estimated maximum of 112,200 cubic yards of soil. Soil would be stockpiled at four (4) soil stockpile sites (see Section 2.1.6).

2.1.11.3.2. Contouring and Shaping

Initial rough grading would blend the top edges and crests of the waste rock stockpiles and the heap and construct the permanent diversion channels. Final grading would construct water catchment basins for revegetation on the tops of the waste rock stockpiles and leach pad. Potential drainage and erosion processes would be important considerations in the design for shape and size of these small water catchment basins. In general, most flat or gently sloping areas would be considered for the construction of the water catchments. Additionally, these catchment basins would be constructed on the side slopes of the heap leach pad.

2.1.11.3.3. Revegetation Test Plots

The Project seeding and revegetation plan has been developed with the information gained from the revegetation test plots and concurrent reclamation conducted to date at Chemgold's nearby Picacho Mine. Additional information regarding successful revegetation developed from Chemgold's experiences at the Picacho Mine would be used, in consultation with, and with the approval of, the BLM and Imperial County, to finalize the Project seeding and revegetation plan.

2.1.11.3.4. Soil Reapplication

Stockpiled soil containing seeds from the Project area would be distributed as equitably as possible to all the areas to be revegetated. Little to no soil may be necessary on the neutralized heap to achieve revegetation success, based upon experience at Chemgold's Picacho Mine. Where necessary, compacted areas would be ripped prior to application of the salvaged soil. Soil would be placed on the prepared areas in the early fall or immediately after final grading, just prior to seeding. Soil placement would be inspected periodically to ensure that a sufficient depth of material is being placed, generally one (1) to two (2) inches, to provide a seed source. The surface would be left in a rough or furrowed state to reduce wind and water erosion and to increase available moisture in the surface soil layer.

2.1.11.3.5. Seedbed Preparation

Seedbed preparation, seeding, and transplant efforts for areas to be revegetated would take place after grading, stabilization, and growth media placement when soil moisture conditions are favorable. Compacted surfaces would be loosened and left in a rough condition by ripping. In selected areas, Chemgold may utilize moisture enhancement basins to promote seed germination and plant growth, and stabilize the surface material from wind and water erosion. These moisture enhancement basins catch natural precipitation, store the water in the soil, and take advantage of natural conditions so irrigation is not necessary.

2.1.11.3.6. Seeding and Planting

The intended seeding mixture is that which is collected from the natural sources located on the Project area. The revegetation -seeding rates would be finalized based upon results from test plots at the Picacho Mine and consultation with the BLM, Imperial County, and the California Department of Fish and Game (CDFG) (as to deer browse). Chemgold, or Chemgold contractors, would collect, prepare, and store native seed for use in reclamation. During final reclamation, the seed mixture would include native plant seeds collected in the local area designed to increase available browse for deer. Any substitutions to the approved native seed would require reapproval by the BLM and Imperial County prior to use.

Seeding would be performed using hand-held seed spreaders or by broadcast seeding in steeper terrain. Seed would not be sown uniformly, but would be concentrated in those areas with better soil moisture retention, such as the moisture catchment basins and at the base of slopes. For broadcast applications, equipment such as a "cyclone" spreader would be used to distribute native live seed immediately after grading when surfaces are rough. Sowing seed by hand was also found to be an acceptable method on rough substrate. Dragging with a light chain or other means to provide some soil cover on the seed did not prove to be necessary if seed is applied immediately on roughened soil surfaces.

Plants deemed valuable for transplanting, such as cactus, ocotillo and young ironwood and palo verde trees or seedlings, would be collected from the Project area prior to surface disturbance. Additionally, seedlings of some species may be grown from seeds collected from the area or equivalent sources. These plants would be carefully placed into prepared locations.

2.1.11.3.7. Schedule

Soil distribution and revegetation activities are limited by the time of year during which they can be effectively implemented. Transplanting of live salvaged plant specimens is best conducted in the late fall. Seedbed preparation and seeding during the late fall or early winter takes advantage of soil moisture received during winter. Germination and growth would be encouraged for most seeds of the native species which are fall or winter germinators. Reclamation has a better chance for success in years with average or above-average precipitation, especially if adequate moisture is available during the November through April time period.

2.1.11.3.8. Weed Control

Weed control in this extreme desert climate has not proven to be a problem at the nearby Picacho Mine or at other mines in the Cargo Muchacho Mountains. Only a few species of exotic plants, generally grasses, have appeared during revegetation efforts. Tamarisk is known to invade wet areas around pits and leach pads. These plants would be periodically controlled through hand eradication over the life of the Project. Based on the extent of the problem, selective spraying with a herbicide would be considered. Other weed species in revegetated areas would be managed only if they should threaten the success of the proposed reclamation.

2.1.11.4. Monitoring and Reclamation Success Evaluation

Revegetation monitoring would be conducted for a minimum of three (3) years following implementation of the post-closure revegetation activities, or until the revegetation success, as defined in Section 2.1.11.4.1, has been achieved. At a minimum, monitoring activities would take place during the peak growth and flower time, usually in April or May. Vegetation monitoring of the site during subsequent years would occur based on seasonal precipitation or other weather conditions.

2.1.11.4.1. Vegetation Monitoring

The goal of the revegetation program is to establish a vegetative cover over the reclaimed area. This depends upon creating a stable situation that would promote the long-term development of a vegetation community typical of the local area. Vegetative cover (the vertical projection of the crown or shoot area of a species to the ground surface expressed as a percent of the total reference area), vegetative diversity (the distribution and abundance of

different plant species within a given reference area), and vegetative density (the number of individuals or stems of each species rooted within a given reference area) would be used as the monitoring parameters.

To determine if the revegetation efforts were successful, comparisons would be made between revegetated sites and sites not disturbed by mining activities. To ensure that the analysis of the undisturbed vegetative community would be statistically valid to within an 80 percent confidence interval, vegetation parameters of the perennial herbaceous and shrub species plus cover of annual species would be sampled in areas adjacent to proposed disturbed sites. Similar vegetation studies would be monitored in areas adjacent to proposed disturbed sites.

After completion of reseeding activities and a suitable growth period, a series of linear plots would be established in the reseeded areas and monitored on an annual basis for a minimum of three (3) years to establish trends in the revegetation success. Chemgold would consider revegetation successful when the monitoring shows the establishment of 30 percent or more of the vegetative cover, 20 percent or more of the vegetation density, and 15 percent or more of vegetation diversity of the perennial shrub and herbaceous vegetation in the monitored reclaimed and revegetated areas, as compared to the current year's monitored sample sites.

In the event of initial failure of the revegetation, Chemgold would consult with the BLM and Imperial County regarding remediation alternatives and revegetation measures that should be undertaken.

2.1.11.4.2. Erosion Monitoring

Techniques used to control the production of sediment include the overall grading design and the revegetation plan. Any storm water surface flows entering the Project mine and process area would be routed away from the project facilities with diversion channels. Additional methods to be employed, if necessary, would include berms, sediment ponds, rip-rap, check-dams composed of straw bales, sand bags, silt fences, or other temporary techniques to minimize impacts. All surface runoff generated from disturbed areas within the Project mine and process area would be collected in the active pit(s), collected in the heap leach system and added to the process solution volume, or collected and directed to sedimentation basins for infiltration. Erosion control methods would be designed to handle a twenty (20)-year/one (1)-hour intensity storm event, in accordance with standards established by 14 CCR 3706(d) (SMARA regulations), and deliver diverted storm waters to

natural drainages at velocities that minimize erosion. Additionally, in accordance with the Storm Water NPDES General Permit requirements, Chemgold would prepare and implement a Storm Water Pollution Prevention Plan (SWPPP), which is a site-specific plan to control drainage and erosion.

If excessive erosion and sedimentation are observed during the mining operations or exploration activities, then modifications to the erosion control methods would be made.

2.1.11.4.3. Reporting

An annual report summarizing the findings of the reclamation monitoring program would be submitted to the BLM and Imperial County each year following the commencement of monitoring. The report would include the acreage disturbed and reclaimed for the current year as well as for the Project to date, the acreage to be disturbed and reclaimed in the future, and document reclamation successes and failures and the extent of reclamation activities. Information obtained during the previous year's reclamation activities would be reviewed, and any necessary modifications to the Reclamation Plan and appropriate bonding requirements presented for incorporation into the ongoing reclamation activities upon approval by the BLM and Imperial County.

2.1.11.5. Financial Assurance

To establish an acceptable bonding instrument for the BLM, Imperial County and the California Department of Conservation, Chemgold would allocate funds to post an irrevocable letter of credit for an amount consistent with the calculated physical reclamation cost estimate of approximately $400,000.00, subject to agency review and approval. Separate financial assurance to cover the neutralization of the heap would be posted with the CRWQCB to meet that agency's separate bonding requirements.

2.1.12. Other Environmental Impact Reduction Measures

Chemgold has proposed the following additional environmental impact reduction measures which have not otherwise been identified above:

- Construction of a fence generally equivalent to the Project perimeter fence entirely around the south-central portion of the central wash within the Project mine and process area which is not intended to be disturbed by Project operations to prevent accidental surface disturbance of the microphyll woodland habitat in this internal area during mine construction and operation.

- Providing periodic irrigation over the life of the Project to vegetation within the south-central portion of the central wash as may be appropriate to enhance the quality of microphyll woodland habitat in this drainage.

- Construction of a big game guzzler in a design and location acceptable to the BLM and the California Department of Fish and Game (CDFG) in the general vicinity of the Project mine and process area to mitigate the loss of habitat for deer and other wildlife.

- Providing periodic irrigation over the life of the Project to the western slopes and banks of the existing ephemeral stream channel immediately adjacent to, but outside of, the east-southeast boundary of the Project mine and process area as may be appropriate to enhance the quality of existing microphyll vegetation and available deer browse on this area of this channel.

- Conducting annual transect surveys of the major through-going ephemeral stream channels upstream and downstream of the Project mine and process area to monitor these drainages with respect to existing vegetation and microphyll woodland habitat.

- Document any potentially adverse erosional or depositional processes, and document any sightings of deer fawn, bighorn sheep and any other significant wildlife species.

- Construction following the completion of reclamation of one or more big game and/or small game guzzlers within the Project mine and process area in a design and location acceptable to the BLM and the CDFG to enhance the restored site as habitat for deer and other wildlife.

- Preparation of a hazardous material spill/release contingency plan which provides appropriate training to all Project employees on the proper response to potential chemical releases.

2.2. Alternatives

2.2.1. Reduced Project Alternative

Under the Reduced Project Alternative, the total tons of ore and waste rock to be mined would be decreased from that proposed under the Proposed Action. The scale of the project would fall somewhere between the No Action Alternative and the Proposed Action, depending on the actual amount of reduction in the project scope.

The smallest Reduced Project Alternative which would likely remain economically viable would be the mining of only the West Pit and the Singer Pit, including portions of the Mineralized Potential Area, and the accompanying construction of the necessary heap leach pad and waste rock stockpile(s) with appropriate capacities. Figure 2-10 provides a ~~potential~~ layout for such a project. As compared to the Proposed Action, this Reduced Project Alternative would likely eliminate the surface area otherwise disturbed by: the East Pit; the "east" waste rock stockpile; the south soil stockpile; and one of the north soil stockpiles. Compared to the Proposed Action, the Reduced Project Alternative would also reduce the surface area disturbed by: mining of the Mineralized Potential Area; the heap leach pad; the "south" waste rock stockpile; and the haul and maintenance roads. Estimates of the surface area disturbed by the Reduced Project Alternative are presented in Table 2-4. The total estimated tons of ore mined would be reduced by approximately 55 percent (Personal Communication - C.K. McArthur, Chemgold, 1995). This alternative would reduce the total amount of mined material to approximately 270 million tons (202.5 million tons of waste rock and 67.5 million tons of ore), assuming a 3:1 waste rock to ore ratio.

Figure 2-10: Reduced Project Alternative - Mine and Process Area Facility Details

Table 2-4: Estimated Disturbed and Undisturbed Acres for the Reduced Project Alternative

MINE FACILITY COMPONENT		DISTURBED ACRES	UNDISTURBED ACRES
Mine and Process Area			
Pits	West Pit	124	
	East Pit	0	
	Singer Pit	34	
	Mineral Potential Area	68	
	Subtotal:	**226**	
Process Facilities	Pad	200	
	Process Facility Area	21	
	Lime Bin Area and Fresh Water Pond	1	
	Subtotal:	**222**	
Waste Rock Stockpiles	East Waste Rock Stockpile	0	
	West Waste Rock Stockpile~~s (two adjacent stockpiles)~~	~~28~~20	
	South Waste Rock Stockpile	180	
	Subtotal:	**~~208~~200**	
Soil Stockpiles	West Soil Stockpile	3	
	North Soil Stockpiles (two adjacent stockpiles)	21	
	South Soil Stockpile	0	
	Subtotal:	**24**	
Support Facilities	Office/Maintenance/Parking/Power	14	
	Haul and Maintenance Roads	120	
	Drainage Diversions	11	
	Subtotal:	**145**	
Mine and Process Area Subtotals:		~~825~~817	~~190~~175
Total Mine and Process Area Acreage:		**~~1,015~~992**	
Ancillary Area			
County Road Realignment		7	
Powerline, Water Wells and Pipeline Route		29	
Ancillary Area Subtotals:		36	-
Total Ancillary Area Acreage:		36	
TOTAL PROJECT AREA DISTURBED AND UNDISTURBED ACREAGE:		**~~861~~853**	**~~190~~175**
TOTAL PROJECT AREA ACREAGE:		**~~1,051~~1,028**	

Under the Reduced Project Alternative, the expected mine life would be reduced from the approximately twenty (20) years under the Proposed Action to approximately

ten (10) years. Since the East Pit would not be mined under the Reduced Project Alternative, there would be no waste rock from the East Pit available to backfill the West Pit (see Figure 2-11 for the Reduced Project contours following the completion of mining but before the implementation of final reclamation). Because the West Pit would not be backfilled to the surface, Indian Pass Road would not be relocated back to its original alignment. However, at the end of mining Chemgold would conduct an assessment, and if the assessment reasonably indicates that ~~there is sufficient indication that~~ ground water encountered in the West Pit may enter the pit in sufficient quantity in spite of evaporation to create a pit lake, Chemgold would then place sufficient backfill into the open West Pit to raise the floor of the pit to a level higher than the level of any pit lake which may be ~~eventually~~ predicted to form from the inflow of ground water.

2.2.2. Complete Pit Backfill Alternative

The Complete Pit Backfill Alternative consists of the complete filling of all of the open pits with mined material to at least original grade. ~~In practice, this~~ This would ~~likely~~ consist of first completing the Proposed Action as proposed. Subsequent to the completion of mining, and concurrent with the final leaching of ore and the commencement of final reclamation, waste rock would be loaded back into the existing haul trucks, which would be driven to the edge of the open pit(s) and the waste rock dumped into the pit(s).

One ton of broken rock occupies a greater volume than one ton -of solid rock. As a result of this "expansion," or "swell factor," all of the rock mined from an open pit will not fit back into that same pit. As currently planned, the total amount of ore and waste rock to be mined as part of the Proposed Action would be approximately 600 million tons, equalling a volume of approximately 287 million cubic yards. Of this 600 million tons, approximately 450 millions tons would be placed on the waste rock stockpiles or back into the West Pit, and approximately 150 million tons would be placed on the heap leach pad. Based on estimated broken densities of 18 cubic feet (0.67 cubic yards) per ton for mined waste rock and 20 cubic feet (0.74 cubic yards) per ton for mined ore, the total volume for all the mined waste rock would be 301.5 million cubic yards, while the mined ore would occupy 111 million cubic yards, for a total of approximately 412.5 million cubic yards of mined material. Under the Complete Pit Backfill Alternative, all of the pits are to be completely backfilled to grade, which is equal to a volume of approximately 287 million cubic yards. It is assumed that approximately 287 million cubic yards of waste rock would be returned to the open pit. The spent leached ore would remain on the heap leach pad, and the remaining approximately 13 million cubic yards of waste rock would remain on the waste rock stockpile(s). Figure 2-12 provides a potential layout for such a project, showing the final residual contours prior to reclamation.

Figure 2-11: Reduced Project Alternative - Mine and Process Area Projected Final Contours

Figure 2-12: Complete Pit Backfill Alternative - Mine and Process Area Projected Final Contours

Since approximately 120 million cubic yards of waste rock would already have been dumped into the West Pit, ~~only~~ approximately 167 million cubic yards would have to be excavated from the waste rock stockpiles and dumped into the open portions of the East Pit. Assuming that the mine equipment can move a maximum of 130,000 tons (~~2.35~~ 2.34 million cubic feet, or ~~87,100~~ 86,700 cubic yards) of excavated material per day, it would require approximately 5.25 years (5 years, 3 months) to move enough waste rock back into the open pits to fill them all to grade. Because the rock is already broken and could be loaded more quickly, and because the haul trucks would be traveling loaded down grade, rather than up grade, backfilling operations may be able to be conducted more quickly. However, because the loading and hauling equipment will be near the end of their useful lives, down time due to equipment maintenance or failures will likely increase substantially over that experienced during initial mining.

Assuming a cost of approximately $0.50 per ton of material moved (Personal Communication - Steve Baumann, Chemgold, Inc., 1996), the total additional cost of completely backfilling the East Pit would be approximately $125 million. Chemgold (Personal Communication - Steve Baumann, Chemgold, 1996) has indicated that this cost exceeds the anticipated return on the Project, and has stated that such a project would not be pursued by a prudent project developer.

Once the pits were backfilled to grade, ~~and all required material moved from the waste rock stockpiles,~~ the backfilled pits and remaining waste rock stockpiles could be reclaimed.

The Complete Pit Backfill Alternative would not result in any reduction of disturbed areas compared to the Proposed Action since the Complete Pit Backfill Alternative includes completion of the Proposed Action. However, a substantial amount of the surface area disturbed by waste rock stockpiles would be reclaimed "at grade," and not reclaimed as a ~~stock~~pile, since most of the waste rock ~~contents of~~ from the stockpile~~s~~ would have been removed and dumped into the open pits.

2.2.3. No Action Alternative

The No Action (no project) Alternative forms the baseline from which the impacts of all other alternatives can be measured. Such action would generally not be consistent with the BLM multiple use mission and policy of making public lands available for a variety of uses, as long as these uses are conducted in an environmentally sound manner, since the subject lands were not withdrawn for any special use and were open, unappropriated lands when unpatented mining claims were staked. If the No Action Alternative is implemented, the Project area would remain

as is, and present uses in the area, including off-highway vehicle use, camping, hunting, and rockhounding, could continue. The site would remain available for future commercial gold processing proposals or for other proposals as permitted by BLM policy or land use designations.

2.2.4. BLM Preferred Alternative

The BLM Preferred Alternative is the alternative that best fulfills its statutory mission and responsibilities, giving consideration to economic, environmental, technical and other factors. BLM believes that the Preferred Alternative is the Proposed Action.

2.3. Alternatives Eliminated from Detailed Consideration

2.3.1. Facility Location Alternatives

2.3.1.1. Alternative Heap Leach Pad Location

The proposed location of the Project heap leach pad was selected by Chemgold after consideration of several environmental and operational factors. These factors were: proximity to the open pits; efficiencies in the construction and operation of the heap leach facility, including a consolidated project layout; desire for gravity flow from the leach pad to the processing facility; avoidance of sensitive environmental resources; and absence of economic mineral reserves or potential economic reserves below the heap leach pad.

Relocation of the heap leach pad from its proposed location to another location within the Project mine and process area would increase the distance from the three (3) open pits, contributing to higher costs, operational inefficiencies, and increased haulage-related emissions. Since there is no operational advantage to relocating the leach pad to any other location within the Project mine and process area, and there appears to be no environmental advantage to be gained by relocating the heap within the Project mine and process area (since all potential areas are to be disturbed, except for the drainages), this alternative was eliminated from further consideration.

Other alternative heap leach pad locations outside of the proposed Project mine and process area to the east or south could be designed, although any of these locations would greatly increase the distance from the three (3) open pits, and lead to substantially higher costs, operational inefficiencies, and increases in energy consumption and haul vehicle emissions. In addition, moving the heap leach pad away from the pits has the potential to create additional environmental

effects from longer haul roads and the isolation of habitat between two (2) major project facilities. Since there is no operational advantage to relocating the leach pad outside the Project mine and process area, and such a relocation appears to create additional environmental impacts, this alternative was eliminated from further consideration.

2.3.1.2. Alternative Waste Rock Storage Areas

The major considerations in selecting locations for the waste rock stockpiles are: minimization of the truck haul distance and gradient from the open pit to the waste rock storage areas (and related costs); consolidation of mine facilities; adequate waste rock storage capacity; avoidance of sensitive environmental resources; and absence of economic mineral reserves or potential economic resources below the waste rock storage area.

Possible alternative locations for waste rock storage exist both inside and outside of the proposed Project mine and process area. However, disposal of the waste rock outside of the proposed Project mine and process area is operationally and environmentally undesirable for the same reasons that location of the heap leach pad outside of the proposed Project mine and process area is undesirable (substantially higher costs, operational inefficiencies, increases in energy consumption and haul vehicle emissions, and isolation of habitat). Since there is no operational advantage to relocating the waste rock stockpiles, and such a relocation appears to create additional environmental impacts, this alternative was eliminated from further consideration.

2.3.1.3. Alternative Water Sources

The Proposed Action includes the development of a well field approximately 4 miles ~~near the~~ southwest ~~corner~~ of the Project mine and process area to provide the water required for the Project. Up to four (4) water wells are planned along a 1.5 mile section of Indian Pass Road within the Project ancillary area (see Figure 2-1). These wells would be connected to the Project mine and process area by pipeline. One well has already been drilled. Specific locations for the three (3) undrilled ground water wells within the Project ancillary area have not yet been selected, although they would be located along the ~~surveyed portions~~ designated section of Indian Pass Road.

Alternative locations for the water well field may exist within the vicinity of the Project mine and process area. The selected well field area has the highest potential for the successful development of ground water resources within a moderate distance of the Project mine and process area. The other alternatives

would either have a lesser potential for success or be substantially farther away. Accordingly, alternative ground water well fields were eliminated from further consideration as alternative water sources.

The only other possible sources of water would be the use of existing surface water resources, either from the Colorado River or the All American Canal. In each case, there appear to be no rights to these waters which can be legally or economically obtained by Chemgold. The 115 afy Colorado River water right currently used by Chemgold for its existing Picacho Mine Project (see Section 5.2.1.3) cannot be transferred (Personal Communication - C.K. McArthur, Chemgold, 1995), and is only approximately 10 percent of the water needed by the Project. Transportation of the required quantity of water from the Colorado River or the All American Canal to the Project could not be accomplished by any means other than pipeline, which would require construction through environmentally sensitive areas and substantial energy expenditures for pumping the water. Since there are no surface water rights sufficient to supply the water requirements of the Project, and moving any surface water to the Project mine and process area appears to create additional environmental impacts, this alternative was eliminated from further consideration.

2.3.1.4. Utility Power Supply Alternatives

Peak Project electrical power requirements of approximately 8 MW would be supplied ~~by a local~~ from the utility system, which would include the "overbuilding" of an existing 34.5 kV transmission line for approximately 16 miles with a new 92 kV transmission line. A new 92 kV transmission line would then be built to the Project mine and process area. Alternative utility sources of this power were considered, but each was eliminated from further consideration for the reasons provided below.

Use of the existing IID 34.5 kV transmission line without upgrade to 92 kV was eliminated by the IID as not capable of transmitting the required 8 MW of power. Use of an existing Western Area Power Authority (WAPA) 161 kV transmission line, which runs parallel and adjacent to the IID 34.5 kV transmission line, was also considered. Two (2) alternative points of interconnection to the WAPA transmission line were considered. One would require the construction of a small 161 kV/34.5 kV substation to take power off of the WAPA line at the point where the WAPA line crosses Indian Pass Road (see Section 2.1.9.3). A 34.5 kV transmission line would then be built parallel to Indian Pass Road to bring power to the Project mine and process area. A second alternative would bring power off of the WAPA 161 kV transmission line at the existing Gold Mine Tap substation, located approximately 8 miles northwest of

the Project mine and process area. A new 92 kv transmission line would be constructed south-southeast, parallel to the existing 161 kV transmission line, for approximately four (4) miles. There, the line would be "overbuilt" on the existing 34.5 kV IID transmission line. Finally, the line would turn east and run approximately 5 miles over new ground to the Project mine and process area. However, WAPA determined that it could not provide the Project with ~~a~~ "firm," or non-discretionary, capacity to transmit the power, thus eliminating any WAPA 161 kV transmission alternative from further consideration.

2.3.1.5. Electrical Power Generation Alternative

Peak Project electrical power requirements would be reduced to less than approximately 2.8 MW if the Project used diesel-powered shovels or loaders instead of electric shovels. To provide power to all of the other facilities located within the Project mine and process area, the Project would install diesel-powered electrical generators at the Shop and Office Facility area instead of overbuilding the 34.5 kV transmission line to connect to ~~a local~~ the utility system. Two (2), 2,000± kW, pre-packaged, diesel generator sets would likely be installed, with one (1) of the installed diesel generator sets being reserved principally as a backup to the operating set. Additionally, two (2), 800± kW, pre-packaged, diesel generator sets would be installed adjacent to one (1) of the ground water production well locations to provide electrical power to the well pump(s). One (1) of the installed diesel generator sets would also be reserved principally as a backup to the operating set. A 7.2 kV distribution line would be built adjacent to the ground water well access road(s) to supply electrical power from the generator(s) to the other ground water well pumps. Annual diesel fuel consumption would rise from approximately 4 million gallons to approximately 5 million gallons. Because this alternative consumed more diesel fuel, creating more on-site air pollution, and did not appear to substantially reduce any of the environmental impacts of the Proposed Action, it was eliminated from further consideration.

2.3.2. Alternative Mining and Processing Methods

2.3.2.1. Underground Mining Alternative

Any proposed mining operation has a minimum ore grade which can be mined profitability, considering the operating, capital, and investment costs evaluated together with a reasonable rate of return. In determining the minimum ore grade that can be profitably mined, the deposits are evaluated in small blocks, which are each assigned a uniform ore grade value based on detailed development drilling. The minimum ore grade that can be mined is the average of the grades of all

blocks proposed to be mined. A model of the ore blocks is developed which focuses on the maximum yield for the minimum amount of ore and waste that would have to be mined. Increased costs in any phase of the operation would require that a higher grade ore be mined to maintain profitability, which conversely means that less ore can be mined from the deposit.

The underground mining method best develops structure-dependent deposits such as quartz veins, shear veins, and shear swarms. Development of underground deposits requires complex technical capabilities and engineering design, which is expensive, and are extremely labor intensive. Normal processing methods for this ore consist of crush-mill operations, and recovery is by gravity separation, chemical leaching, or combinations of both. Cash costs associated with underground mining operations are about $60.00 to $70.00 per ton of mined ore, due largely to the labor-intensive, low-productivity nature of these operations. Thus, underground mining results in higher operating costs and higher capital costs per ton of ore mined. At a gold sale price of $400.00 per ounce, a minimum underground minable grade is typically at least 0.15 ounces of gold per ton of ore.

From the distribution of ore grade and tonnage for the Project deposits, no ore is present within the Project deposits that falls above the minimum grade for underground mining. Therefore, underground mining is not economically feasible for the Project, and this alternative was eliminated from further consideration.

2.3.2.2. Vat Leaching Process Alternative

The vat leaching process is somewhat similar to heap leaching, except that the ore is first crushed to a fine particle size, then leached in large, shallow tanks. Vat leaching is an appropriate technique to employ with ores with rapid gold dissolution rates, typically extraction rates of no more than three (3) days. It is more capital intensive than heap leaching, requiring more surface facilities, including the leach tanks. Vat leaching produces the same amount of leached material as the heap leach process per ton processed, although the vat leaching process creates wet tailings rather that heaped material. Vat leaching also consumes substantially more water than heap leaching for the same quantity of material processes.

Processing the Project ore by vat leaching would still lead to mining the ore deposits as proposed. However, because vat leaching increases operating costs, only higher grade ore could be profitably mined and leached, which would lead to a substantial decrease in the quantity of mined ore and possibly an increase in the quantity of mined waste rock. Surface disturbance from mining operations would

likely remain very similar to that of the Proposed Action, for while no heap leach pads are necessary for vat leaching, tailings from the vat leaching cycle would occupy a much larger area than the heap leach pads since the material could not be stacked as high.

Because metallurgical testing of Project ores indicates the necessity of leaching periods in excess of 90 days to reach ultimate gold extraction levels, vat leaching is not an operationally feasible alternative for Project ores. In addition, the vat leaching alternative appears to have environmental disadvantages over the proposed heap leach process because of the air emissions from crushing the ore and the requirement for tailings disposal. Accordingly, this alternative was eliminated from further discussion.

2.3.2.3. Carbon-in-Pulp Leaching Process Alternative

The carbon-in-pulp (CIP) method of gold extraction requires the consumption of substantial energy to grind crushed ore material to fine particle sizes that both liberates the gold and exposes the maximum mineral surface area. Due to the need for substantial grinding facilities and structures, this alternative process requires considerably more capital investment and would incur greater operating costs (due to higher energy requirements) than the heap leach process. A similar amount of land area is generally required for the carbon-in-pulp and vat leaching process alternatives, both of which use substantially more land for the storage of wet tailings than the heap leach process. Substantial additional capital is also required to construct suitable tailings containment facilities and associated process equipment.

Because of these considerations, CIP leaching is typically more appropriate for the higher grade ore bodies, those in excess of 0.05 ounces of gold per ton of rock. This higher grade of gold does not exist in sufficient quantities to justify a profitable Project mine. In addition, the CIP alternative appears to have environmental disadvantages over the proposed heap leach process because of the requirement for tailings disposal. Accordingly, this alternative was eliminated from further discussion.

2.3.2.4. In-situ Leaching/Carbon Adsorption Process Alternative

In-situ leaching involves the injection of leaching solution directly into an ore body while it is still in place in the ground. The gold-bearing solution is recovered by pumping from extraction wells, and processed by carbon adsorption. The method requires suitable geologic formations to confine the solution until it can be recovered. If the gold-bearing deposits are not defined between formations

which would contain the leaching solutions, the potential for adverse effects to ground water and soils may be substantial.

Many linear geologic structures, such as faults and shears, are located within the Project mine and process area, and are pervasive within the overall Project area. These structures could serve as conduits for solutions injected to leach the ore deposits to travel beyond the control of the operator. The risk of ground water and soil contamination by use of this method for the Project deposits precludes its consideration as a viable and environmentally safe alternative, and thus it was eliminated from further consideration.

2.3.2.5. Flotation Alternative

The flotation method of gold extraction is used for ores containing appreciable quantities of sulfide minerals. Physical observations, microscopic analysis, and metallurgical tests conducted to date have confirmed that the Project ore is essentially sulfide-free. Consequently, flotation is not considered suitable for the Project, and this alternative was eliminated from further consideration.

3. AFFECTED ENVIRONMENT

3.1. Geology and Mineral Resources

3.1.1. Geological Setting

The Project mine and process area is located in southeast California within the Colorado Desert portion of the Basin and Range physiographic province along the southwestern flank of the Chocolate Mountains (Norris and Webb, 1976). The southeastern portion of the Chocolate Mountains consists largely of Jurassic age gneisses and schists overlain by Tertiary age basalts, fanglomerates, and Quaternary age alluvium (see Figure 3-1 ~~Figure 2-1 of Appendix D of this EIS/EIR~~). A thin veneer of flood basalt caps the gravel and forms distinct ridges and land forms (Clark, 1970).

About 95 percent of the Project mine and process area consists of Quaternary age alluvium (in the active ephemeral stream channels) and older alluvium (in the upland areas), which vary in thickness from 10 to ~~700~~ 1,000 feet. Below the Quaternary age sediments, the geologic section in the Project mine and process area consists of the Jurassic schist and gneiss units unconformably overlain by Tertiary andesite and basalts (see Figure 3-2). The lowermost unit that will be exposed during mining activities is an undifferentiated Jurassic gneiss which forms the footwall to the orebody (Personal Communication - Dan Purvance, Chemgold, Inc, 1996). Generally above the undifferentiated gneiss is a biotite gneiss which has sericitic schist zones that appear to be structurally and/or hydrothermally localized. The biotite gneiss varies from a white quartzo-feldspathic rock to a dark gray hornblende-biotite gneiss. Often the biotite gneiss has a shatter-breccia texture that is variably cemented by iron oxides, clays and less commonly quartz or carbonate. The sericitic schist is a white, red-to-tan iron-oxide-stained rock composed predominantly of sericite with minor quartz. The sericite schist is weak and highly foliated.

A discontinuous horizon of Tertiary basalt flows and volcanicistic mudflows (and/or paleosoil horizons) with basaltic fragments rest unconformably on the Jurassic rocks (Personal Communication - Dan Purvance, Chemgold, Inc, 1996). This volcanic unit is discontinuous and thin, ranging from zero (0) to 100 feet in thickness within the Project mine and process area. A Tertiary age conglomerate overlies the volcanics, or lies directly on the Jurassic metamorphics where the volcanics are absent. The conglomerate is typically a moderately well indurated, clay/carbonate/iron oxide-cemented material with coarse, subangular gneissic fragments in a moderate- to coarse-grained sand matrix with considerable mica component. Zones of finer-grained material, including silty sands and silts, are present locally.

Figure 3-1: Generalized Regional Geologic Map

Figure 3-2: Simplified Geologic Cross Section through the West Pit ~~Project Mine and Process Area~~

Dominant regional structural features include the Chocolate Mountains thrust fault, which placed basal gneissic rocks over the younger Orocopia Schist (see Figure 3-1), and the San Andreas fault system. The Project mine and process area is structurally aligned and equidistant between the Picacho and Mesquite gold deposits. A complex geologic setting exists within the area as evidenced by detachment fault features identified at the Picacho and American Girl mines and intricate strike-slip fault systems identified at the Mesquite Mine (Tosdal, et al., 1991). Structural patterns within the Project mine and process area identified by exploration drilling to date consist of west-northwest to northwest trending faults cut by northeast trending high angle faults (Personal Communication - Dan Purvance, Chemgold, Inc, 1996). A south-southwest dipping low angle fault bounds the orebody at its base and along the north side (see Figure 3-9). ~~[note - I removed the discussion regarding shear zones since it is better explained on page 3-9. However, the statement as included may remain "confusing" by talking about faults, not localized shear zones.]~~

The Imperial Valley is at the southern end of the San Andreas Fault system, probably the most studied and best known fault system in the United States. The San Andreas system transects the northeastern margin of the Imperial Valley approximately 63 miles northwest of the Project area (see Figure 3-3). Other major Holocene faults also shown within the region on Figure 3-3 include several faults which parallel, or are "en echelon," to the southern section of the San Andreas Fault, most notably the reported East Mesa Fault, the East Highline Canal lineament, the Imperial-Brawley Seismic Zone, the Superstition Hills Fault (San Jacinto Fault Zone), and the Elsinore Fault. Some geologic references for the area also indicate the possible existence of a postulated fault (Sand Hills Fault) beneath the Algodones Sand Dunes, which may represent the inactive eastern boundary of the Salton Trough spreading center (Heath, 1992). No evidence has been documented to indicate that the Sand Hills Fault has ~~ruptured~~ been active in Holocene time. The active faults currently associated with the eastern boundary of the Salton Trough are now coincident with the East Mesa Fault and possibly the East Highline Lineament (Heath, 1992). Figure 3-4 shows that the ~~The~~ Project area itself is located in a relatively aseismic portion of Imperial County (BLM, 1993b).

Geologic relationships in the nearby Mesquite Mine indicate that northwest and northeast-trending faults which control mineralization are known to be pre-Holocene in age (greater than 10,000 years old). The Miocene-Pliocene Age (3 to 11 million year old) Bear Canyon Conglomerate has been cut by a northeast-trending system that is no younger than late Pleistocene Age (about 10,000 to 60,000 years old). Faults mapped in the Mesquite Mine pits have not ruptured the 35,000 to 40,000 year old alluvial surfaces within the Mesquite project vicinity (Tosdal, et al., 1991).

Figure 3-3: Regional Holocene Fault Map

Figure 3-4: Historic Epicenter Map

3.1.2. Mineral Resources

The Imperial Project is located midway between the historic Mesquite, Picacho, Tumco and Cargo Muchacho gold mining districts south of the Chocolate Mountains in eastern Imperial County, California (see Figure 3-5). The first gold mining in the region is attributed to early Spanish communities in the Cargo Muchacho Mountains in 1780 (Clark, 1970). Mining interest in the region increased soon after the Mexican War in 1848 and the advent of the California Gold Rush in 1849, and peaked between 1870 and 1930. Production from the mines at Picacho, Tumco, and American Girl peaked in the early 1900's, producing a cumulative total of approximately 500,000 ounces of gold. Scattered, small-scale dry wash placer operations were attempted throughout the region and many small tailings piles from these operations are still visible.

Increasing gold prices and bulk tonnage leaching technology developed in the 1970's led to exploration and subsequent development of open pits at the Picacho Mine in 1979, and the Mesquite and American Girl mines in 1980.

Little mining history exists for the Project area itself. Bedrock ~~exposed in~~ exposed in ~~sparse~~ limited locations on the north side of the Project mine and process area was first prospected by Dick and Alice Singer (Personal Communication - Steve Baumann, Chemgold, Inc., 1995). Between 1982 and 1985, Gold Fields Mining Corporation conducted a regional exploration program comprised of aeromagnetic, gravity and resistivity surveys and stream wash geochemical studies. Gravity anomalies, low-grade mineralization in exposed bedrock, and a very limited drilling program led to the discovery of minor mineralization in the fringe areas of the current Imperial Project mine and process area.

In 1987, Glamis Gold Exploration, Inc. (GGX) acquired the claims and began exploration drilling through a joint venture agreement with a third party. In 1994, GGX became the sole owner and operator of the claims and initiated an accelerated development drilling and pre-feasibility program. This program ultimately culminated in the delineation of the three (3) ore bodies designated by the proposed East Pit, Singer Pit and West Pit. Continued exploration drilling between the proposed open pits may ultimately discover additional mineral reserves.

Gold mineralization at the Project mine and process area occurs in Jurassic-age granitic gneiss in the upper plate of the Chocolate Mountains thrust (see Figure 3-1). The thrust has an estimated throw of 48 kilometers to the northeast, moving gneiss and intrusive rocks over greenschist facies schists. Analysis of drill information indicates that the deposit's geology is similar to that observed at the nearby Picacho and Mesquite gold deposits. The mineralization occurs in sub-tabular blocks

Figure 3-5: Historic Mining Districts in the Vicinity of the Imperial Project

averaging 200 to 300 feet thick and is structurally controlled by the intersection of low-angle and high-angle shear zones which are localized to the ore body (see Figure 3-2) (Personal Communication - Dan Purvance, Chemgold, Inc., 1996). Gold is associated with limonite and hematite in highly sheared and brecciated gneiss, and minor hydrothermal alteration is present as a weak form of sericitization. Oxidation extends to depths in excess of 1,500 feet below ground surface and, to date, no pyrite or other sulfide minerals have been observed in the ore or waste rock, other than oxidized remnants of pyrite in some drill cuttings.

No other mineral resources are known within the Project area.

3.2. Soil Resources

A report of the soil inventory conducted for the Project area was prepared in June, 1995 (Bamberg and Hanne, 1995a; see Attachment 2 to Appendix~~-C~~ A). The inventory report identified the various soil series mapped in the Project area, discussed the salvage potential and suitability of the soil material for reclamation activities, and contained recommendations for reclamation and revegetation activities in the area.

Most of the Project mine and process area is covered by desert pavement. The dominant mapped soil units are generally representative of relic paleosoils which formed under cool, moist conditions, not the hot, arid conditions of the current climate. A summary of the principal characteristics of the four (4) soil units identified in the Project mine and process area are presented in Table 3-1. The most notable aspects of the four (4) major types of soil are: coarse texture with large fragments; low organic matter and available nutrients; high salts and excess alkalinity; and, in some of the soils, high concentrations of other chemicals, such as boron and nitrates. Soil depths vary from as shallow as two (2) inches to generally less than 24 inches.

Table 3-1: Summary of Soil Characteristics within the Project Mine and Process Area

Taxonomic and Mapping Unit	Classification	Topographic Position	Unit Salvageable (percent)	Salvage Volume (cu.yd)	Soil Depth (in.)	Primary Salvage Limitations
A (Laprosa/Rock outcrop complex)	Exposed weathered gneiss and sandy-skeletal, mixed, lithic Haplocalcids	Low ridges, dissected	0	0	0-20	Rock outcrop, surface rubble
B	Sandy-skeletal, mixed hyperthermic, Torriopsamments	Recent alluvial fans and washes	50	16,800	0-20	Gravel texture, rock
C	Sandy-skeletal, mixed hyperthermic Torriopsamments	Shallow washes along drainages	65	26,200	18-24	Shallow, narrow extent
D	Sandy-skeletal, mixed, hyperthermic Petrocalcids	Old alluvial upland flats and slopes	3	69,200	0-24	Salt content, mixed alluvium, rock

3.3. Hydrologic Resources

3.3.1. Surface Waters

The Project area is located within the Salton Sea Drainage Basin, a closed hydrologic basin in which all surface flows drain toward the Salton Sea, a saline water body which has no outlet. However, surface water which flows from or through the Project area is prevented from reaching the Salton Sea by the Algodones Sand Dunes, a natural topographic constraint located approximately 12 miles downstream of the Project area to the southwest (see Figure 3-5). Surface flows either evaporate or infiltrate into the wash bottoms or outwash areas east of the Algodones Sand Dunes.

There are no free-standing surface waters present within the Project area or vicinity. The region's low precipitation rate, coupled with the high evaporation rate and the presence of highly permeable soils in the washes, preclude the formation of perennial or intermittent streams. The perennial water source located closest to the Project mine and process area is the Colorado River, approximately seven (7) miles northeast of the Project mine and process area at its closest point. This is outside of the Salton Sea Drainage Basin, on the other side of the Chocolate Mountains. The perennial water sources located within the Salton Sea Drainage Basin closest to the Project mine and process area are the All American Canal, approximately sixteen (16) miles south, and the Coachella Canal, a branch of the All American Canal, approximately nineteen (19) miles southwest, on the other side of the Algodones Sand Dunes. The All American Canal, which transports water from the Colorado River, is the primary source of water within the Salton Sea Drainage Basin.

3.3.1.1. Surface Flows

Surface water drainages within the Project area consist of a series of subparallel ephemeral washes which are fed by precipitation from infrequent winter storms and summer thunderstorms. Four (4) primary washes flow into the Project mine and process area. Two (2) of these washes flow together within the Project mine and process area, such that only three (3) major washes exit the Project mine and process area (see Figure 3-6). Each of these washes continue as separate channels beyond the Project mine and process area, each eventually ending in individual areas of infiltration on the eastern edge of the Algodones Sand Dunes (see Figure 3-5).

The local catchment areas for these four (4) washes were determined, and estimates of peak flow in each of the washes at the upstream boundary of the Project mine and process area calculated through use of a simple computer model

for both the Probable Maximum Precipitation (PMP) storm event and the 100-year, 24-hour storm event (WESTEC, Inc., 1994). Table 3-2 presents these catchment areas and peak flow estimates for each of the four (4) washes.

Table 3-2: Estimated Peak Runoff In Washes Through the Project Mine and Process Area

Storm Event	**Precipitation (inches)**	**Peak Runoff (cubic feet per second)**			
		Basin A	**Basin C**	**Basin D**	**Basin E**
Basin Area (acres)	N/A	1,870	595	890	576
PMP	5.0	4,933	1,467	2,217	1,427
100-yr, 24-hr	3.5	1,643	473	718	460

3.3.1.2. Water Quality

No direct data regarding the quality of the surface waters which occasionally flow through the Project area ~~is~~ are available. Because water flows in these washes only during infrequent storm events, and because there is no significant surface disturbance nor unusual natural sources of contaminants located upstream, the quality of the water flows are assumed to be typical of similar desert washes (i.e. very high in suspended solids and variable in dissolved solids). Based upon observations made during the "Waters Study" (see Section 3.3.1.3), the principal throughgoing stream channels appear to be currently "in balance;" that is, the reaches of the principal washes within the Project mine and process area are currently neither depositing nor eroding sediment, but simply carrying it through the Project mine and process area.

3.3.1.3. Surface Waters of the United States

The U.S. Army Corps of Engineers (USACOE), under Section 404 of the Clean Water Act, regulates the discharge of dredged or fill material into "waters of the United States" (33 U.S.C. 1251-1376). "Waters" are broadly defined at 33 CFR 328.2 to include non-tidal waters, including intermittent watercourses (commonly known as 'isolated waters') (33 CFR 328.3(a)(3)) and tributaries to such watercourses (33 CFR 328.3(a)(5)). "Isolated waters of the United States" include "All other waters such as *intrastate* lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation, or destruction of which could affect interstate or foreign commerce...", including those "which are

Figure 3-6: Principal Washes Within the Project Mine and Process Area

or would be used as habitat by birds protected by Migratory Bird Treaties; or which are or would be used as habitat by other migratory birds which cross state lines; or which are or would be used as habitat for endangered species; or used to irrigate crops sold in interstate commence" (51 FR 41217). Only vegetation which is used as habitat which is located within the "ordinary high water mark" (OHWM) of a channel, qualifies that reach of the "isolated waters" as "waters of the United States."

The limits of ACOE jurisdiction on "non-tidal waters of the United States" extends to the OHWM, in the absence of adjacent wetlands (33 CFR 328.4(c)(1)); or beyond the OHWM to the limits of the adjacent wetlands, when adjacent wetlands are present (33 CFR 328.4(c)(2)); or to the limits of the wetlands when only wetlands are present (33 CFR 328.4(c)(3)).

Surveys were performed to identify "waters of the United States," including wetlands, in and around the Project mine and process area (EMA, 1996a; see Appendix D). The surveys inventoried each of the three (3) principal throughgoing washes within the Project mine and process area, as well as all tributaries, to determine which met the criteria of "waters" and "waters of the United States" (see Figure 3-7). No wetlands were identified within the Project mine and process area. However, 52.86 acres of land within the Project mine and process area were determined to be within the OHWM of the washes, and thus were determined to be "waters." Of these 52.86 acres, only 25.31 acres were determined to qualify as "waters of the United States" because they contained vegetation which may be "used as habitat by birds protected by Migratory Bird Treaties; or which are or would be used as habitat by other migratory birds which cross state lines."

3.3.2. Ground Waters

The Project area is located within what has recently been termed the Amos-Ogilby-East Mesa ground water basin (Environmental Solutions, Inc., 1993a; WESTEC, Inc., 1996), which is roughly equivalent to the "Sand Hills Area" and "East Mesa Area" described by Dutcher, et. al. (1972). The basin is a northwesterly trending, elongated area of approximately 860 square miles within the southeastern portion of Imperial County, California, but which likely extends for hundreds of additional square miles into northern Mexico. It is bounded on the northeast by the Chocolate Mountains, on the north by the drainage divide which separates the Amos Basin from the East Salton Sea Basin, on the west by the finer sediments in the irrigated portion of the Imperial Valley, and to the south by the arbitrary political boundary with Mexico (see Figure 3-8). The alluvial sediments which make up the water-bearing aquifer range in thickness from zero (0) feet on the eastern boundary at

Figure 3-7: Waters of the United States Within the Project Mine and Process Area

Figure 3-8: Amos-Ogilby-East Mesa Ground Water Basin and Ground Water Production Wells Near the Project Area

the Chocolate Mountains to as much as 10,000 feet at the western boundary in the Imperial Valley (Environmental Solutions, Inc., 1993a).

The principal historic source of recharge to the water-bearing deposits within the Amos-Ogilby-East Mesa Basin has been reported to be leakage from the Colorado River and the All American and Coachella Canals (see Figure 3-8). An estimated 20,000 afy entered the basin from the Colorado River as underflow between the Cargo Muchacho Mountains and Pilot Knob, and the USGS (Loetz, 1975) estimated that in the late 1960's the All American and Coachella Canals contributed about 100,000 and 130,000 afy, respectively, to the ground water basin. Relatively little recharge comes from infiltration of local precipitation and runoff. Since the lining of the first 45 miles of the Coachella Canal from the All American Canal in the 1980's essentially eliminated leakage from the Coachella Canal, total recharge to the basin is roughly estimated at 100,000 afy (Environmental Solutions, Inc., 1993a). Current plans to line the All American Canal in the area of the Algodones Sand Dunes and East Mesa, which would reduce the amount of annual recharge to the basin by an estimated 67,700 afy (U.S. Bureau of Reclamation, 1994b), have been suspended (Personal Communication - ~~personal communication,~~ Michael Walker, U.S. Bureau of Reclamation, 1996).

The water in storage within the nonmarine deposits of late Tertiary and Quaternary age of the Amos-Ogilby-East Mesa Basin to a depth of 3,000 feet is estimated at approximately 230,000,000 acre-feet (Environmental Solutions, Inc., 1993a). Lower stratigraphic units found in the western portions of the Amos-Ogilby-East Mesa Basin and under the East Mesa area frequently produce geothermal waters of elevated temperature (Dutcher, et. al., 1972). Hydraulic conductivity within the basin has been reported as ranging from about 250 to 1,150 gpd/ft^2, with aquifer transmissivity reported to range from approximately 136,000 to as high as 880,000 gpd/ft (Environmental Solutions, Inc., 1993a; U.S. Bureau of Land Management, 1994b).

3.3.2.1. Ground Water Quantity

Although the principal source of recharge to the Amos-Ogilby-East Mesa Basin is reported as leakage from the Colorado River and the All American Canal, the United States Geological Survey (USGS) has recently determined that the Project area is outside of that area from which ground water production would be replaced by Colorado River water (Wilson, R.P., et al., 1994).

The area of the local catchment upgradient of the Project well field production area (ancillary area) has been estimated at approximately 30,000 acres. Since the average annual rainfall at the neighboring Gold Rock Ranch is approximately

3.60 inches (or 0.3 feet) (GSi/Water, 1993), a conservative average of 9,000 afy of precipitation falls within the catchment area. However, since nearly all of the precipitation falling within the catchment area evaporates or is consumed by plants in the vegetated portions of the basin, relatively little precipitation infiltrates and actually provides basin recharge (Environmental Solutions, Inc., 1993a). Estimates of the infiltration percentage range from one (1) to ten (10) percent, which translates to 90 to 900 afy of ground water recharge into the basin upgradient of the Project well field production area (GSi/Water, 1993).

The Project area is underlain by undifferentiated alluvial~~,~~ and lacustrine deposits of quaternary and tertiary age which rapidly thicken from the Chocolate Mountains towards the desert floor to the southwest (see Figure 3-9). The alluvium within the Project mine and process area ranges from 10 feet to as much as 1,000 feet in places (WESTEC, Inc., 1996). Ground water beneath the Project area occurs within three (3) different aquifers (see Figure 3-9 and Figure 3-10): an unconfined alluvial aquifer (the uppermost aquifer, which has a water table which is open to direct infiltration); a confined alluvial aquifer (which is bounded both above and below by relatively low permeability (impermeable) beds); and a bedrock aquifer. The alluvial aquifers consist of consolidated and unconsolidated sands and gravels. The bedrock aquifer is comprised of fractured and jointed gneissic and granitic rocks (WESTEC, Inc., 1996).

Ground water flow within the Project area is generally from the higher elevations of the Chocolate Mountains toward the alluvial basin of the valley floor, and the ground water gradient is generally from the northeast to the southwest (WESTEC, Inc., 1996). ~~One (1)~~ Two (2) ground water monitoring wells, eleven (11) piezometer holes, and one (1) ground water ~~exploration~~ production well were installed by Chemgold and its consultants in order to obtain more specific information regarding the characteristics of the alluvial and bedrock aquifers in the Project area (WESTEC, Inc., 1996, and EMA, 1996c; see Appendix E-1 and Appendix E-2 of this EIS/EIR). Figure 3-11 is a map of the locations of these holes and wells and the static ground water level (potentiometric) surface derived from these holes and wells. Table 3-3 provides the physical data (name, location, depth to ground water, and aquifer) for those holes and wells from which water quality data has been obtained.

Figure 3-9: Cross Section A-A' (Northeast-Southwest) Through the Project Area Showing Hydrologic Units

Figure 3-10: Cross Section B-B' (Northwest-Southeast) Through the Project Area Showing Hydrologic Units

Figure 3-11: Location Map of Imperial Project Area Ground Water Holes and Wells and Ground Water Potentiometric Map

Table 3-3: Summary of Physical Data From Selected Piezometer Holes, Monitoring Wells, and Production Wells

HOLE NUMBER	LOCATION	TOTAL DEPTH (ft bgs)	DEPTH TO STATIC WATER (ft bgs)	AQUIFER
Piezometer Holes				
94H-1	Mine and Process Area	1,000	657.2	Alluvial (unconfined)
EC-5	Mine and Process Area	800	720	Bedrock
WC-5	Mine and Process Area	800	606	Bedrock
WR-2	Mine and Process Area	945	694.5	Alluvial (unconfined)
Monitoring Wells				
MW-1	Mine and Process Area	640	479.7	Conglomerate (confined)
MW-2	Mine and Process Area	880	657.2	Bedrock
Production Wells				
PW-1	Water Supply Area	960	544.4	Alluvial (confined)

Static ground water elevations in the wells completed in the alluvial aquifers ranged from a high of 360 feet AMSL immediately northeast of the Project mine and process area to a low of 70.5 feet AMSL in the southwest corner of the Project mine and process area, which produces a gradient from northeast to southwest. Variations in measured static water levels ~~within the alluvial aquifers~~ were attributed to the wells being completed in the ~~two (2)~~ different aquifers (WESTEC,~~,~~ Inc., 1996; EMA, 1996c).

Static ground water elevations in the bedrock aquifer ranged from a high of 211 feet AMSL in the area of the proposed West Pit to a low of 85.5 feet AMSL approximately two (2) miles southwest of the Project mine and process area. With the exception of the elevation in the West Pit, all of the bedrock aquifer measurements produced an essentially flat surface; the anomalously high West Pit bedrock aquifer elevation was attributed to either the fracture-controlled nature of the aquifer or an unknown ground water barrier between the two (2) proposed pits (WESTEC, Inc., 1996).

Preliminary testing of the confined alluvial aquifer from a piezometric hole located adjacent to the ground water exploration well (approximately 4.5 miles southwest of the Project mine and process facilities) indicated a hydraulic conductivity of ~~9.2~~ 1.85 x 10^{-4} ft/sec (WESTEC, Inc., 1996; see Appendix E-1 of

this EIS/EIR). Transmissivity values for this same alluvial aquifer, calculated from the 48-hour constant rate pumping and recovery test of the ground water exploration well, were calculated to range from approximately 7,200 gpd/ft to 42,508 gpd/ft. Preliminary slug and falling head tests of the piezometers completed in the bedrock aquifer showed very low hydraulic conductivities, on the order of 10^{-8} ft/sec (WESTEC, Inc., 1996).

There is currently no ground water being produced from beneath the Project area. Limited pumping of ground water occurs from the Amos-Ogilby-East Mesa Basin in the immediate vicinity of the Project area, this from: a well located at Gold Rock Ranch (approximately four and one-half (4.5) miles southwest of the Project production well field area); two (2) wells located at the American Girl Mine (approximately eight (8) miles south of the Project production area); and three (3) production wells located at the Mesquite Mine area (approximately eight (8) miles west-northwest of the Project production area) (see Figure 3-8). The produced ground water is authorized for mining and domestic uses. The well at the Gold Rock Ranch is used to supply domestic water for the ranch. Current usage is estimated at 5,000 gpd (less than six (6) afy), with an estimated historic maximum usage rate of 12,000 gpd (less than fourteen (14) afy), as estimated by the owner (U.S. Bureau of Land Management, 1994b). Ground water usage for the American Girl Mine operations was reported as less than 200 afy (U.S. Bureau of Land Management, 1994b). The rate of production of water from the Mesquite Mine wells was reported at approximately 1,500 afy (Environmental Solutions, Inc. 1993a).

3.3.2.2. Ground Water Quality

Ground water quality within the Amos-Ogilby-East Mesa Basin consistently shows levels of ~~specific conductance,~~ total dissolved solids (TDS), chloride, and fluoride which exceed drinking water standards (Environmental Solutions, Inc., 1993a). TDS concentrations range from 1,100 mg/l in the Mesquite Mine wells to greater than 3,000 mg/l in the Glamis and Boardman wells (WESTEC, Inc., 1996). In general, the ground water is not suitable as drinking water without prior treatment, although the quality is sufficient for use in mining operations.

~~Ground water samples collected and analyzed from the Project ground water monitoring well, the piezometer holes, and the ground water exploration well show TDS levels at the low end of the range for wells completed within the basin, from 600 to 1,500 mg/l, and the water quality appears to be suitable for non-potable uses (WESTEC, Inc., 1996). The ground water exploration well, which probably represents the best sample of ground water quality for the Project area, had a TDS of only 906 mg/l. Iron, aluminum, and manganese~~

~~concentrations in a number of the piezometer hole ground water samples exceeded secondary drinking water standards, although these elevated metal concentrations may be due to the use of drilling fluids during the well drilling operations (WESTEC, Inc., 1996). The fluoride concentration in the ground water exploration well was 1.6 mg/l, which slightly exceeded the California maximum contaminant concentration of 1.4 mg/l, but all other trace element concentrations were below applicable water quality standards (WESTEC, Inc., 1996).~~

Table 3-4 provides water quality data for the Project ground water monitoring and production wells. Filtered samples from the upgradient monitoring well (MW-1) met all primary drinking water standards, but exceeded the secondary drinking water standards for TDS and manganese. The downgradient monitoring well (MW-2) met all primary drinking water standards except for arsenic, and exceeded secondary drinking water standards for chloride, manganese, sulfate, and TDS. The production well (PW-1) met all primary drinking water standards except for fluoride, and exceeded secondary drinking water standards for chloride, iron, and TDS. TDS levels were at the lower end of the range for wells completed within the basin, and the water quality appears to be suitable for non-potable uses (WESTEC, Inc., 1996) [see Appendix E-1]. Stiff and Piper diagrams (see Figure 2-3 in Appendix E-2) indicate that the dominant cation species are sodium and potassium, while the dominant anion varies from sulfate and carbonate/bicarbonate near the Project mine and process area to chloride and sulfate in the alluvial basin.

Table 3-4: Water Quality Data from Project Monitoring and Production Wells

Element	Units	Current Drinking Water Quality Standards	Well Number										
			MW-1	MW-1	MW-1	MW-1	MW-1 A	MW-1 B	MW-2	MW-2	MW-2 A	MW-2 B	PW-1
Collection Date			08/30/95	11/28/95	04/22/96	08/15/96	08/29/96	08/29/96	07/11/96	08/15/96	08/29/96	08/29/96	11/19/95
Field Filtering			unfiltered	unfiltered	unfiltered	unfiltered	filtered	unfiltered	unfiltered	unfiltered	filtered	unfiltered	filtered
Alkalinity	mg/l		138	183	183	171	163	186	246	169	95	195	32
Aluminum	mg/l	1.0 (1) 0.02 (2)	0.5	1.7	<0.1	0.3	<0.02	1.37	0.7	1.3	<0.02	4.03	<0.1
Antimony	mg/l	0.006 (1)	<0.5	<0.5	<0.04	<0.003	<0.005	<0.005	<0.003	<0.003	<0.005	<0.005	<0.002
Arsenic	mg/l	0.05 (1)	<0.005	0.005	0.02	<0.005	<0.01	0.01	<0.005	<0.005	0.09	0.11	0.009
Barium	mg/l	1.0 (1)	0.2	<0.1	0.2	<0.1	0.17	0.21	0.1	0.1	0.04	0.08	<0.1
Beryllium	mg/l	0.004 (1)	<0.1	<0.1	<0.002	<0.002	<0.001	0.001	<0.002	<0.002	<0.001	0.002	<0.0002
Bismuth	mg/l		<0.1	<0.1	<0.1	<0.1	<1	<1	<0.1	<0.1	<1	<1	<0.1
Boron	mg/l						0.50	0.53			4.95	5.06	
Cadmium	mg/l	0.005 (1)	0.0004	0.0006	<0.0002	<0.002	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.0002
Calcium	mg/l		83	38	53	34	49.4	57.1	64	80	67.3	108	57
Chloride	mg/l	250 (2)	92	110	91	39	56.1	61.1	130	120	641	606	320
Chromium	mg/l	0.05 (1)	<0.1	<0.1	<0.1	<0.1	<0.01	0.03	<0.1	<0.1	<0.01	0.07	<0.1
Cobalt	mg/l		<0.1	<0.1	<0.1	<0.1	<0.03	<0.03	<0.1	<0.1	<0.03	<0.03	<0.1
Field Conductance	µmhos/cm						832	832			2460	2460	
Copper	mg/l	1.0 (2)	<0.1	<0.1	<0.1	<0.1	<0.01	<0.01	<0.1	<0.1	<0.01	0.03	<0.1
Fluoride	mg/l	1.4 (1)	0.2	0.5	0.2	0.3	0.6	0.6	0.2	0.2	0.6	0.6	1.6
Gallium	mg/l		<0.1	<0.1	<0.1	<0.1	<0.5	<0.5	<0.1	<0.1	<0.5	<0.5	<0.1
Iron	mg/l	0.3 (2)	1.4	3.4	<0.1	0.2	<0.03	4.39	0.5	1.7	<0.03	6.64	0.4
Lead	mg/l		0.009	0.015	<0.002	<0.005	<0.003	0.049	<0.003	<0.005	<0.003	0.024	<0.002
Lithium	mg/l		<0.1	<0.1	<0.1	<0.1	0.04	0.06	<0.1	<0.1	0.58	0.67	0.1
Magnesium	mg/l		31	6	6.7	3.4	5.3	5.7	28	31	19.0	27.5	1.5
Manganese	mg/l	0.05 (2)	<0.1	0.3	0.1	<0.1	0.70	1.10	<0.1	0.20	0.09	0.50	<0.1

Element	Units	Current Drinking Water Quality Standards	Well Number										
			MW-1	MW-1	MW-1	MW-1	MW-1 A	MW-1 B	MW-2	MW-2	MW-2 A	MW-2 B	PW-1
Mercury	mg/l	0.002 (1)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005
Molybdenum	mg/l		<0.5	<0.5	<0.1	<0.1	<0.05	<0.05	<0.1	<0.1	0.12	0.06	<0.5
Nickel	mg/l	0.1 (1)	<0.1	<0.1	<0.1	<0.1	<0.04	0.04	<0.1	<0.1	<0.04	0.08	<0.1
Nitrate Nitrogen	mg/l	10 (1)	0.1	0.6	<0.1	<0.1	0.13	0.05	0.2	0.3	0.07	<0.05	1.9
pH	mg/l	6.8 - 8.5	7.99	7.6	7.47	7.29	7.69	7.51	7.79	7.49	7.70	7.64	8.2
Phosphorous	mg/l		<0.1	0.3	<0.1	<0.1	0.09	0.31	<0.1	<0.1	0.03	0.80	<0.1
Potassium	mg/l		6	6.9	4.7	4.1	6	10	8.6	5.9	10	20	0.1
Scandium	mg/l		<0.1	<0.1	<0.1	<0.1	<0.01	<0.01	<0.1	<0.1	<0.01	<0.01	<0.1
Selenium	mg/l	0.05 (1)	<0.001	<0.001	<0.001	<0.001	<0.01	<0.01	<0.001	0.001	<0.01	<0.01	<0.001
Silver	mg/l	0.1 (2)	<0.0005	<0.0005	<0.0005	<0.002	<0.01	<0.01	<0.002	<0.002	<0.01	<0.01	<0.0005
Sodium	mg/l		130	200	160	150	159	135	140	150	537	463	260
Strontium	mg/l		1.8	1.2	4.5	0.3	4.28	4.19	1.3	1.3	2.57	2.61	0.8
Sulfate	mg/l	250 (2)	290	200	210	160	230	211	320	270	360	230	180
TDS	mg/l	500 (2)	799	712	656	529	620	640	728	804	1780	1690	906
Thallium	mg/l	0.002 (1)	<1	<1	<0.0005	<0.001	<0.002	<0.005	<0.001	<0.001	<0.002	<0.005	0.001
Tin	mg/l		<1	<1	<1	<0.5	<0.05	<0.05	<1	<0.5	<0.05	<0.05	<1
Titanium	mg/l		<0.1	<0.1	<0.1	<0.1	<0.01	<0.01	<0.1	0.1	<0.01	0.01	<0.1
Vanadium	mg/l		<0.1	<0.1	<0.1	<0.1	<0.05	<0.05	<0.1	<0.1	<0.05	<0.05	<0.1
Zinc	mg/l	5.0 (2)	0.3	0.9	<0.1	<0.1	<0.01	0.06	<0.1	0.1	<0.01	0.26	<0.1

(1) California Primary Maximum Contaminant Limit
(2) California Secondary Maximum Contaminant Limit

3.4. Air Resources

3.4.1. Regulatory Framework

Ambient air quality and the emission of air pollutants are regulated under both federal and California laws and regulations. In addition, there are local requirements and standards which provide regulation of both air quality and the emission of air pollutants in the Project area.

The federal Clean Air Act (CAA), and the subsequent Clean Air Act Amendments (CAAA), required the ~~U.S. Environmental Protection Agency (~~ USEPA~~)~~ to identify national ambient air quality standards (NAAQS) to protect public health and welfare. NAAQS have been established for six (6) pollutants, known as "criteria" pollutants because the standards satisfy "criteria" specified in the CAA. A list of the criteria pollutants regulated by the CAA, and the standards set by the USEPA for each, are listed in Table 3-5.

The California Air Resources Board (CARB), which is part of the California Environmental Protection Agency (Cal-EPA), is the California state agency with responsibility for establishing California Ambient Air Quality Standards (CAAQS) under the California Clean Air Act (CCAA). The CAAQS are generally more stringent than the NAAQS. A list of the California "criteria" air pollutants, and the CAAQS adopted for each, are also included in Table 3-5.

Pursuant to the CAA, the USEPA has developed classifications for distinct geographic regions known as air basins. Under these classifications, for each federal criteria pollutant, each air basin (or portion of an air basin) is classified as in "attainment," if the air basin has "attained" compliance with (that is, not exceeded) the adopted NAAQS for that pollutant, or is classified as "non-attainment" if the levels of ambient air pollution exceed the NAAQS for that pollutant. Air basins which have not received sufficient analysis for certain criteria pollutants are designated as "unclassified" for those particular pollutants. Air basins located within California receive similar designations with respect to the CAAQS.

3.4.2. Meteorological Setting

The Project area is a desert environment characterized by very hot summers and mild winters. Humidity in the area is very low, with the exception being July and August, when humid winds may blow in from the Gulf of California, located southeast of the Project area (U.S. Bureau of Land Management, 1994a). Precipitation in the area is low, with the average annual rainfall measured at the

neighboring Gold Rock Ranch being only approximately 3.60 inches per year (GSi/Water, 1993).

Table 3-5: Federal and State Ambient Air Quality Standards for Criteria Pollutants

Criteria Pollutant	Averaging Period	California Standards	Federal Standards	
		Concentration[a]	Primary[a]	Secondary[a]
Ozone (O_3)	1-Hour	90 ppbv (180 $\mu g/m^3$)	120 ppbv (235 $\mu g/m^3$)	Same as Primary Standards
Carbon Monoxide (CO)	8-Hour	9 ppmv (10 mg/m^3)	9 ppmv (10 mg/m^3)	-
	1-Hour	20 ppmv (23 mg/m^3)	35 ppmv (40 mg/m^3)	
Oxides of Nitrogen (NO_x) as Nitrogen Dioxide (NO_2)	Annual	-	53 ppbv (100 $\mu g/m^3$)	Same as Primary Standards
	1-Hour	250 ppbv (470 $\mu g/m^3$)	-	
Sulfur Dioxide (SO_2)	Annual	-	30 ppbv (80 $\mu g/m^3$)	-
	24-Hour	40 ppbv (105 $\mu g/m^3$)	140 ppbv (365 $\mu g/m^3$)	-
	3-Hour	-	-	500 ppbv (1,300 $\mu g/m^3$)
	1-Hour	250 ppbv (655 $\mu g/m^3$)	-	-
Particulate Matter ≤ 10 Microns in Diameter (PM_{10})	Annual Geometric Mean	30 $\mu g/m^3$	-	-
	24-Hour	50 $\mu g/m^3$	150$\mu g/m^3$	Same as Primary Standards
	Annual Arithmetic Mean	-	50 $\mu g/m^3$	
Sulfates (SO_4)	24-Hour	25 $\mu g/m^3$	-	-
Lead (Pb)	30-Day	1.5 $\mu g/m^3$	-	-
	Calendar Quarter	-	1.5 $\mu g/m^3$	Same as Primary Standards
Hydrogen Sulfide (H_2S)	1-Hour	30 ppbv (42 $\mu g/m^3$)	-	-

[a] Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 mm mercury. Measurements of air quality are corrected to a reference temperature of 25°C and a reference pressure of 760 mm mercury (~~1.013.2~~ 1,013.2 millibar); ppmv and ppbv in this table refer to ppm and ppb by volume, respectively, or micro-moles of pollutant per mole of gas. $\mu g/m^3$ ≡ micrograms per cubic meter (CARB, 1994).

Two (2) general wind patterns exist in the region (U.S. Bureau of Land Management, 1994a). From October to May, the prevailing winds are out of the west and northwest, and it is during these periods that humidity is at its lowest. Summer wind patterns, especially during July and August, are dominated by heat-induced low-pressure areas formed over the California desert, which draw air from the Gulf of California and the northern portion of Mexico. During these conditions, humidity is at its highest. The months of June and September are transitional months. Wind speeds in the region tend to be moderate, ranging from 5 to 8 mph at night (weakest in the late spring and strongest in the winter) to daytime winds averaging between 9 and 13 mph (strongest in the winter and early spring, weakest in the fall). These wind speeds tend to promote mixing, and generally transport locally generated air emissions away from the area (U.S. Bureau of Land Management, 1994a).

3.4.3. Air Quality

The Project area is located within the Imperial County portion of the Southeast Desert Air Basin (SEDAB). The Imperial County portion of the SEDAB is entirely under the jurisdiction of the Imperial County Air Pollution Control District (ICAPCD). That portion of Imperial County west of the crest of the Chocolate Mountains, which includes the Project area, is designated as "non-attainment" under both the NAAQS and CAAQS for particulate matter less than 10 microns in diameter (PM_{10}) (Pechan & Associates, 1993). All of Imperial County is designated "non-attainment" for ozone (O_3) under the CAAQS, and is designated as "attainment" for sulfates/sulfur dioxide (SO_4/SO_2) and oxides of nitrogen (NO_x), and "unclassified" for carbon monoxide (CO), under the NAAQS and CAAQS, as applicable (U.S. Bureau of Land Management, 1994a).

The ICAPCD-run stations for monitoring atmospheric pollutants located in California nearest the Project area are in El Centro and Brawley, California, approximately 46 miles west-southwest and 42 miles west, respectively, of the Project mine and process area. Both O_3 and PM_{10} are measured at the El Centro station, whereas only PM_{10} is measured at the Brawley station. In addition, since 1985 PM_{10} has been measured at four (4) stations located adjacent to, and operated by the operators of, the Mesquite Mine, which is located approximately ten (10) miles northwest of the Project mine and process area.

The Imperial Valley is classified as "non-attainment" for PM_{10} by both the USEPA and CARB. During the 1988-1993 period, daily averages for PM_{10} measured at Brawley exceeded the CAAQS a total of 141 days (CARB, 1989-1994). The highest number of exceedance days (35) in a single year was recorded in 1989, with 676 $\mu g/m^3$ being the highest recorded 24-hour PM_{10} concentration. Similarly, daily averages for PM_{10} measured at El Centro during the same period exceeded the CAAQS a total of 122 days. The highest number of exceedance days (31) in a single year was also recorded in 1989, with 287 $\mu g/m^3$ being the highest recorded 24-hour PM_{10} concentration (U.S. Bureau of Land Management, 1994a). No data is currently available regarding the existing ambient PM_{10} concentrations in or immediately adjacent to the Project area, although monitoring at the Mesquite Mine during 1991 indicated that the 24-hour CAAQS for PM_{10} was likely exceeded a total of 27 days that year (U.S. Bureau of Land Management, 1994a). Background PM_{10} levels calculated from the PM_{10} measured at the Mesquite Mine during 1991 and 1992 are reported as 19.9- $\mu g/m^3$ (U.S. Bureau of Land Management, 1994a). The federal NAAQS was never exceeded at the Mesquite Mine during that year, although measurements taken at Brawley and El Centro did exceed the NAAQS (U.S. Bureau of Land Management, 1994a).

Sources of PM_{10} in Imperial County are both natural and anthropogenic (related to the activities of man). The primary source of PM_{10} and the related pollutant, Total Suspended Particulates (TSP), in Imperial County is fugitive dust from area sources, principally vehicular traffic on unpaved roads and wind erosion of cultivated agricultural land, although PM_{10} and TSP transported into the Imperial Valley from Mexico ~~is~~ are also substantial (Pechan & Associates, 1993). PM_{10} can also be created indirectly in the atmosphere from chemical reactions that convert gaseous precursors into small particles. These PM_{10} precursors, which are predominantly products of man-made combustion, include NO_x, reactive organic gases (ROGs), and oxides of sulfur (SO_x). Principal existing PM_{10}/TSP sources in the vicinity of the Project area are wind erosion from disturbed areas, vehicular traffic on unpaved roads, and fugitive and point source emissions from nearby mining operations.

Ozone (O_3) is a photochemical oxidant which is not typically emitted directly into the atmosphere, but is formed in the atmosphere through chemical reactions among emission precursors and ultraviolet light. Imperial County is classified as "attainment" by the USEPA for O_3 since recent ambient air monitoring for O_3 at the El Centro station has not indicated any exceedances of the federal NAAQS for O_3. However, between 1988 and 1993 there were a total of 45 exceedance days (139 hours) of the lower CAAQS for O_3 (CARB, 1989-1994). The highest number of exceedance days (25) in a single year was recorded in 1993, with 150 ppbv being the highest recorded 24-hour O_3 concentration. A substantial portion of the O_3 measured in Imperial County is believed to be transported into the basin from other areas, principally from the South Coast Air Basin (SOCAB)~~,~~ and Mexico, and these sources are likely the cause of at least some of the measured exceedances of the O_3 CAAQS (U.S. Bureau of Land Management et.al., 1994a).

Hydrocarbons, or more specifically ROGs (also known as reactive organic compounds (ROCs)), are not strictly criteria air pollutants, but are recognized as precursors of photochemical oxidants, including O_3, and are also precursors to atmospheric particulate matter, both of which are criteria air pollutants. In addition, oxides of nitrogen (NO_x) and oxides of sulfur (SO_x), some forms of which are criteria pollutants, are also precursors to photochemical oxidants and atmospheric particulate matter. Table 3-6 presents a list of the criteria pollutants which can be created by secondary reactions from emissions of the precursors ROGs (ROCs), NO_x, and SO_x.

Table 3-6: Secondary Criteria Pollutants from Emissions of ROG, NO_x, and SO_x.

Precursor	Secondary (Criteria) Pollutants
Reactive Organic Gases (ROGs)	a) photochemical oxidants (ozone)
	b) the organic fraction of suspended particulate matter
Oxides of Nitrogen (NO_x)	a) nitrogen dioxide (NO_2)
	b) the nitrate fraction of suspended particulate matter
	c) photochemical oxidants (ozone)
Oxides of Sulfur (SO_x)	a) sulfur dioxide (SO_2)
	b) sulfate (SO_4)
	c) the sulfate fraction of suspended particulate matter

Source: SCAQMD, 1994.

Principal sources of ROGs in the atmosphere include vehicular and industrial emissions and unsaturated hydrocarbon emissions from trees and other vegetation. No data is currently available regarding the levels of hydrocarbons in the ambient air in the Project area or immediate vicinity, but they are presumed to be negligible due to the lack of significant emissions sources, including nearby existing mining operations (which typically have few sources of ROGs except for internal combustion engines). Similarly, no data is available regarding existing levels of sulfur dioxide (SO_2) and nitrogen dioxide (NO_2) in the ambient air in the immediate Project area, although the levels of these pollutants are also presumed to be small because of the absence of local sources.

In addition to the NAAQS, the CAA has also requires the designation of airsheds within the United States into one (1) of three (3) classes, which are designed to prevent the deterioration of air quality below the NAAQS. Class I is the most restrictive air quality category, and was created by Congress to prevent further deterioration of air quality in national parks and wilderness areas of a given size which were in existence prior to 1977 or have since been designated under federal regulations (40 CFR 52.21). All remaining areas outside of the Class I area boundaries were designated as Class II airsheds, which allows a relatively greater deterioration of air quality over that in existence in 1977, although still below NAAQS. No Class III areas, which would allow air quality to degrade down to the NAAQS, have been designated.

Federal Prevention of Significant Deterioration (PSD) regulations require that the maximum allowable increase in ambient particulate matter ~~(TSP)~~ in a Class I airshed resulting from a major stationary source is 5 $\mu g/m^3$ (annual geometric mean) and

10 $\mu g/m^3$ (24-hour average). Specific types of facilities which emit, or have the potential to emit, 100 tons per year or more of PM_{10}, or any facility which emits, or has the potential to emit, 250 tons per year or more of PM_{10}, is considered a major stationary source. However, most fugitive emissions are not counted as part of the calculation of emissions for PSD. There are no Class I airsheds within 100 kilometers of the proposed Project area (U.S. Bureau of Land Management et.al, 1994a).

3.5. Biological Resources

3.5.1. Regulatory Framework

3.5.1.1. Federal Endangered Species Protection

The federal Endangered Species Act of 1973, as amended (ESA), provides the general regulatory framework for the protection of threatened or endangered (T/E) plant and animal species and critical habitat which are formally listed under the ESA. The ESA defines the following terms:

- Endangered species: "... any species which is in danger of extinction throughout all or a significant portion of its range ..."

- Threatened species: "... any species which is likely to become an endangered species within the foreseeable future..."

- Critical habitat: "... the specific areas within the geographical area occupied by the species ... on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection ..."

The ESA is administered by the U.S. Fish and Wildlife Service (USFWS), in consultation with other federal agencies (see Section 3.5.2).

In addition to listed T/E species, the USFWS identifies another group of species known as special status species (formerly candidate species). Special status species are not specifically afforded the same protection under the ESA as T/E species, but federal agencies are required to consider special status species in their planning and decision-making processes. The BLM evaluates special status species in a manner analogous to T/E species, and the BLM is required to deny approval of any project that may lead to the listing of special status species~~{Nancy Nicolai: can you provide EMA with a citation for this requirement?}~~.

3.5.1.2. California Endangered Species Protection

The California Endangered Species Act of 1984 (CESA) and the California Native Plant Protection Act of 1977 (CNPPA) provide the framework for protection of California listed rare or endangered plant or animal species. The state also affords protection to candidate species which have been accepted for state review for potential listing as rare, threatened or endangered species. CESA status definitions include:

- Endangered: A native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant which is in serious danger of becoming extinct throughout all, or a significant portion, of its range due to one or more causes, including loss of habitat, change of habitat, overexploitation, predation, competition, or disease.

- Threatened: A native species or subspecies of a bird, mammal, fish, amphibian, reptile or plant that, although not presently threatened with extinction, is likely to become an endangered species in the foreseeable future in the absence of the special protection and management efforts required by this chapter (Fish and Game Code Chapter 1.5).

- Rare: A species, subspecies or variety is rare when, although not presently threatened with extinction, it is in such small numbers throughout its range that it may become endangered if its present environment worsens.

- Candidate: A native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant that the Fish and Game Commission (Commission) has formally noticed as being under review by the California Department of Fish and Game (CDFG) for addition to either the list of endangered species or the list of threatened species, or a species for which the Commission has published a notice of proposed regulation to add the species to either list.

- Species of Special Concern: Native species or subspecies that have become vulnerable to extinction because of declining population levels, limited ranges, or rarity. The goal is to prevent these species from becoming endangered by addressing the issues of concern early enough to secure long term viability for these species.

The CEQA process requires lead agencies to consult with the CDFG if proposed projects will adversely impact T/E species or their critical habitat (see Section 3.5.3).

3.5.1.3. BLM Sensitive Species

Plant and animal species are listed by the BLM as sensitive species if the species has been identified as a proposed T/E species or a special status species by the USFWS, or if the species has been designated as sensitive by the BLM State Director from information obtained from the California Native Plant Society (CNPS), California Natural Diversity Data Base (CNDDB), or other authoritative sources. The purpose of this listing it to provide increased management attention to species which may subsequently be listed as a federal or state T/E species as a result of declining populations or habitat.

3.5.1.4. California Native Plant Society

The CNPS is a professional society of plant biologists, scientists, and associated professionals which has accumulated a statewide data base on California native plants and their distribution. The CNPS has created four categorical listings of plants to identify their respective concern for these species as potential rare, threatened, or endangered species. These listings do not afford legal status or protection for the species, but the lists are utilized by agencies in their planning processes for activities which may impact the species or habitat. The listing categories include:

- <u>CNPS 1A</u>: Plant species presumed to be extinct in California.
- <u>CNPS 1B</u>: Plant species presumed to be rare, threatened, or endangered in California or elsewhere.
- <u>CNPS 2</u>: Plant species presumed to be rare, threatened, or endangered in California but common elsewhere.
- <u>CNPS 3</u>: Plant species for which more information is needed to be properly categorized, and includes an assemblage of taxa that have been transferred from other lists or have been suggested to CNPS for consideration.
- <u>CNPS 4</u>: Plant species which are not currently threatened or vulnerable but are considered to have limited distribution in California and, because of their uncommon status, should be monitored.

3.5.1.5. California Natural Diversity Data Base

The CNDDB is a computerized inventory of information on the general location and condition of California's rare and threatened animals, plants, and natural communities maintained by the CDFG. The species inventoried by the CNDDB are listed (both state and federal) endangered, threatened, and rare animals and plants. The CNDDB also includes species that the scientific community considers deserving of official listing. Sensitive species proposed for federal listing, USFWS special status species (formerly candidate species), and state candidate species are also identified by the CNDDB. The CNDDB includes information for reported sightings only, and it may not cover every project location. Therefore, site-specific biological surveys are typically required.

3.5.1.6. Migratory Bird Treaty Act

Provisions of the Migratory Bird Treaty Act (16 USC 701-718h) are applicable to birds within the Project area. The Act makes no provisions for the killing of any migratory birds without a permit. Any activity, including mining operations or cyanide heap leaching processes, which repeatedly or negligently fails to prevent migratory bird mortality, could be prosecuted under the Act. With the exception of three (3) bird species: (a) English sparrow (*Passer domesticus*); (b) starlings (*Sturnus vulgaris*); and (c) barnyard pigeons (*Columba livia*), all birds are considered migratory under the Act. Raptors and many other birds are protected from hunting under the Act.

3.5.1.7. Bald Eagle Protection Act

The golden eagle (*Aquila chrysaetos*) is not listed under the federal ESA as a threatened or endangered species, but the golden eagle is a fully protected species in California. In addition, amendments to the Bald Eagle Protection Act (PL 92-535) provide additional federal protection to the golden eagle.

3.5.2. U.S. Fish and Wildlife Service Consultation

The ESA requires that the USFWS be formally consulted by federal agencies for those actions proposed by the federal agency which may adversely affect listed T/E species or their critical habitats. Protection under the ESA also extends to species and habitat proposed for listing, and the BLM extends protective status to species and habitat identified by the USFWS as candidates for listing. The ESA prohibits the "take" (i.e., killing, harming, or harassment) of listed T/E species without special exemptions. Section 7(a) of the ESA requires that federal agencies responsible for authorizing projects (authorizing agencies) which may adversely affect a listed

species, or may adversely modify listed critical habitat designated for such a species, undertake consultation with the USFWS. As discussed below, consultation may be informal or formal.

Informal consultation is a process that includes all discussions and correspondence between the authorizing agency and USFWS and is designed to determine if formal consultation is required. Unless it is readily apparent that formal consultation is necessary, the authorizing agency will typically first consult informally on all actions that may affect a listed species or its listed critical habitat. The authorizing agency will also typically seek recommendations for modification of actions that will avoid the likelihood of adverse effects and contribute to achieving recovery objectives for the listed species or its critical habitat.

Formal consultation is initiated by the authorizing agency through the preparation, and submittal to the USFWS, of a Biological Assessment prepared by the authorizing agency for the "proposed action." This Biological Assessment would be utilized in association with other informational resources by the USFWS to prepare the Biological Opinion. The Biological Opinion will determine if the "proposed action" is likely to jeopardize the continued existence of a listed species. A section of the Biological Opinion would specify the terms and conditions under which the listed species may be taken. This section also determines appropriate levels of take, as defined by individuals of the species killed, injured, or moved, and the amount of critical habitat subject to temporary and/or permanent disturbance. If the USFWS' Biological Opinion determines that the "proposed action" may jeopardize the continued existence of a listed species, then the authorizing agency must notify the USFWS in writing prior to its final decision on the "proposed action."

The consultation process is terminated by: (a) the issuance of a biological opinion by the USFWS; (b) notification by the authorizing agency that the "proposed action" is not likely to occur; or (c) a determination by the authorizing agency (with the concurrence of the USFWS) that the "proposed action" is not likely to adversely affect any listed species.

3.5.3. California Department of Fish and Game Consultation

3.5.3.1. State Listed Species

The CESA also prohibits the "take" of any state listed species. The CEQA lead agency is required to consult with the CDFG to determine if proposed projects are likely to jeopardize the continued existence of any T/E species or result in the destruction or adverse modification of habitat essential to the continued existence of any T/E species (Fish and Game Code § 2081). The

CDFG ~~may authorize~~ has historically authorized exceptions to individuals which would allow the "take" of state listed species for management purposes under Section 2081 of the California Fish and Game Code. Where applicable, the Section 2081 process establishes measures for the protection of the affected T/E species and ~~its~~ their habitat during project actions. Where a species is both federal and state listed, and a project is subject to both NEPA and CEQA, the CDFG is encouraged to participate to the extent practical in the federal consultation and adopt a coordinated biological opinion with the USFWS that reflects consistent and compatible findings between state and federal agencies.

Fourteen (14) animal and three (3) plant state-listed species have been identified by the CDFG within Imperial County (CDFG, 1995). Project impacts on each of these species and their habitat must be considered by the CDFG under Section 2081.

3.5.3.2. Stream Alteration Agreement

Entities which propose to divert, obstruct or change the natural flow or the bed, channel or bank of any river, stream or lake in which there is at any time an existing fish or wildlife resource, must first notify the CDFG prior to the activity (Fish and Game Code § 1603). When an existing fish or wildlife resource may be "substantially adversely affected by the project or activity," the CDFG must respond to the notice by providing a description of the resource which would be affected and submitting a proposal for measures necessary to protect fish and wildlife. The affected entity is provided an opportunity to accept the CDFG proposal or through consultation reach a mutual agreement on measures necessary to protect fish and wildlife (i.e., Stream Alteration Agreement). If no agreement can be reached, then a panel of arbitrators is established with the power to settle disagreements and make binding decisions regarding fish and wildlife modifications. The project or activity may not proceed unless it is conducted in conformance with a Stream Alteration Agreement or the decisions of the panel of arbitrators.

A Stream Alteration Agreement would be required to conduct Project activities within the ephemeral drainage channels within the Project mine and process area. Of concern would be the effects of the Project on the wildlife and wash habitat.

3.5.4. Biological Setting

3.5.4.1. Project Location

The Project area is located in an Eastern Colorado Desert environment in southeastern Imperial County. The Project mine and process area is located on a broad south and west facing alluvial plain southwest of Indian Pass, between the Cargo Muchacho Mountains (approximately four (4) miles south) and Peter Kane Mountain (approximately six (6) miles north). The elevation over the Project mine and process area ranges from about 760 feet to 925 feet AMSL with the lower, and nearly flat, elevations in the south and southwest. Elevations gradually increase to the north and northeast with topography characterized by a series of gently rolling ridges separated by interconnecting drainages generally trending from northeast to southwest.

Soils within the Project area are dominated by desert pavement in the upland areas with gravel-based alluvial soil in the major drainages and the west-central portion of the Project mine and process area (see Section 3.2). Soils of the upland landscape support very little vegetation. A soil resource evaluation of the Project mine and process area was conducted by Bamberg and Hanne (August 1995a) and is provided as Attachment D to Appendix ~~F to~~ A of this report.

There are no springs, seeps, permanently wet areas, wetlands, nor standing surface water within the Project area. Three (3) primary, sub-parallel, ephemeral stream channels traverse the Project mine and process area (see Section 3.3.1). The largest ephemeral stream channel is located near the western boundary of the Project mine and process area and parallels Indian Pass Road (see Section 3.3.1.1 and Figure 3-6). Two (2) branches of a second ephemeral channel enter the north-central portion of the Project mine and process area, merge, and exit the south-central portion of the Project mine and process area as a single ephemeral stream channel. The third ephemeral steam channel is located in the east portion of the Project mine and process area. Precipitation in the Colorado Desert tends to occur in short, intense events and average annual precipitation in the Project area is approximately 3.6 inches (see Section 3.4.2). The infrequent rain events result in temporary flow in the channels across the ~~site~~ Project area which quickly infiltrates in the sandy and gravelly wash bottoms providing some residual moisture to the wash vegetation between storm events.

Fluvial processes in the washes affect the rate of deposition and type of material deposited on the wash bottoms. Fluvial processes also affect nutrient cycling and biogeochemical processes in soils and water. These processes affect the vegetation and plant communities which can establish in the washes. As

discussed in Section 3.3.1.2, the principal throughgoing stream channels appear to be currently "in balance" (i.e., the reaches of the principal washes within the Project mine and process area are currently neither depositing nor eroding sediment, but simply carrying it through the proposed Project mine and process area). The majority of the Project area is subject to very slow erosional deflation by wind. Wash bottoms have a veneer of recently deposited gravelly rock in the wash bottoms with sand and gravel along the banks. This erosional material moves through the site by the flushing action of water flow following infrequent storm events (Bamberg and Hanne, 1995). Surface runoff from this region, which comprises a portion of the Chocolate Mountains basin area, and includes the Project area, drains into individual isolated areas along the eastern boundary of the Algodones Dunes foothills, providing moisture to pockets of microphyll vegetation.

3.5.4.2. Special Biological Resource Management Areas

The Project area is located within the BLM's California Desert Conservation Area (CDCA) and is subject to the applicable plans and goals of the CDCA Plan. The CDCA Plan (1980) indicates that a prescriptive Habitat Management Plan (HMP) would be prepared by the BLM for the Indian Wash area, which includes the Project area. The long-term goals for the Indian Wash HMP stated in the CDCA Plan were to protect, stabilize, and/or enhance wildlife resource values in the area. The Indian Wash HMP would set forth management actions to meet these goals, including: (a) control of vehicle use; (b) ~~restricting~~ restriction of camping and parking; and (c) ~~increased~~ increasing surveillance in the area. The BLM has not yet prepared or implemented the Indian Wash HMP (Personal Communication - Nancy Nicolai, BLM; July 1, 1996).

Two (2) wilderness areas, Indian Pass Wilderness Area and Picacho Peak Wilderness Area, are located north and east of the Project area, respectively (see Figure 3-12). While not specifically developed as biological resource management areas, significant protection to plants and animals within these areas is afforded by their designation as wilderness.

The USFWS has designated specific areas as desert tortoise critical habitat in an effort to manage the recovery of this species. The nearest desert tortoise critical habitat to the Project area is the Chuckwalla Unit, located at its closest approximately two (2) miles northwest of the Project mine and process area (see Figure 3-12).

Figure 3-12: Special Biological Resource Management Areas Located in the Vicinity of the Project Area

3.5.5. Vegetation

Vegetation within the Project area is characterized by: (a) tree/shrub vegetation in and adjacent to the ephemeral stream channels; and (b) shrub/scrub vegetation on the upland areas between the stream channels (Bamberg and Hanne, 1995b). Vegetation associations within the Project area are shown on Figure 3-13. All of the vegetation is highly adapted to be able to succeed in the harsh environment.

Dominant species within the channels include ironwood (*Olneya tesota*) and palo verde (*Cercidium floridum*), with a diverse plant association containing cat's-claw (*Acacia greggii*), purple heather (*Krameria erecta*), desert lavender (*Hyptis emoryi*), Anderson thornbush (*Lycium andersonii*) and yellow felt-plant (*Horsfordia newberryi*). Dominant desert scrub species include creosote bush (*Larrea tridentata*), burrobush (*Ambrosia dumosa*), ocotillo (*Foaquieria splendens*), and brittlebush (*Encelia farinosa*). Several sparsely populated cactus species are found within this habitat, including Bigelow cholla (*Opuntia bigelovii*), cottontop cactus (*Echinocactus polycephalus*), beavertail cactus (*Opuntia basalaris*), diamond cactus (*Opuntia ramosissima*), and California barrel cactus (*Ferocactus cylindiceus*).

A site-specific baseline vegetation survey of the entire Project mine and process area and a buffer zone (total of approximately 1,700 acres) was conducted in June 1995 by Bamberg and Hanne (August 1995b). The report of the vegetation survey is provided as Appendix F to this EIS/EIR. The survey report notes that the weather during the spring of 1995 included significant rains which provided abundant moisture and the washes had flowed for a short period of time. In addition, the previous three (3) years had also been a wet cycle with periods of heavy rain that resulted in extremely favorable conditions for plant growth and productivity in the Project area. This was evident in the good growth observed in perennial trees and shrubs, and by herbaceous annuals, during the survey. Vegetative growth was reported to have been higher over the last three (3) years than it had been in the previous 15-20 years. The results of the vegetation survey were interpreted to represent the highest cover and diversity possible in the Imperial Project area with more than four times (>4x) the cover which would be expected following a series of dry years.

Vegetation within the Project mine and process area is categorically creosote shrub type, but for the purposes of the survey the vegetation was subdivided into shrub/scrub vegetation observed on the open, drier alluvial flats and slopes; and tree/shrub vegetation observed on the sides of washes and drainages. Approximately 95 percent of the Project mine and process area is the shrub/scrub type with an almost non-existent vegetative ground cover. These upland areas were further subdivided into three (3) topographic subtypes as summarized below:

Figure 3-13: Vegetation and Habitat Associations Within the Imperial Project Area

- Desert pavement: Covers an estimated 35 percent of the uplands; vegetation is extremely scarce; water and seeds cannot generally penetrate the surface; estimated vegetative ground cover at the time of the survey ranged from 0 to 0.5 percent.

- Alluvial flats and slopes: Covers an estimated 64 percent of the uplands; characterized as areas within the desert pavement that have had their alluvial surfaces disturbed in the last 1,000 years by erosion or deposition; spacing of plants by clumping in favorable areas; vegetative ground cover estimated at the time of the survey ranged from 7 to 9 percent.

- Rock outcrop/thin soil: Occurs in a small (1 percent) upland area in the north-central portion of the site; characterized by vegetation growing in cracks and between rocks; vegetation density is very low and clumped; vegetative ground cover estimated at the time of the survey was 2 to 4 percent.

The tree/shrub vegetation type occurs on the sides and banks of the washes, and represents a total of approximately 5 percent of the Project mine and process area. Two (2) topographic subtypes were identified as follows:

- Broad major washes: Drainages which cross the study area and continue out onto the broad alluvial flats southwest of the Project area toward the Algodones Dunes; characterized as washes ranging from almost flat to fifteen (15) feet ~~(15')~~ deep and eight (8) to 225 feet (average 40 feet~~'~~) wide; plant cover at the time of the survey ranged from 0 percent in the sandy bottom areas to 66 percent on some sides and mid-wash clumps.

- Shallow subsidiary washes: Narrower (average 30 feet~~'~~) than the broad major washes and not as deep; finer soils washed or deposited within them; fewer and smaller trees with additional species present; plant cover at the time of the survey was irregular on the bottoms and the sides of these secondary drainages and averaged 35 to 45 percent.

During the vegetation survey evidence of previous human disturbance within the Project mine and process area was ~~evident~~ observed including roads and access trails and some previous trenching for exploration in the rock outcrop area. Plants had been periodically collected or cut, in particular, many of the older ironwood trees had been cut and were left as old stumps or resprouted bases on the sides of washes throughout the Project mine and process area.

Rado (1995) observed heavy prior cutting of ironwood trees in all of the washes within the Project area extending for at least one and one-half (1½) miles in each

direction from the Project mine and process area. This was evidenced by old ironwood stumps and discarded branches. The reason for the heavy cutting of ironwood trees is unknown, but it has probably resulted in the loss of many ironwood trees, reduced the tree canopy and degenerated the microphyll woodland habitat in the area. Little regeneration of the ironwoods has occurred (Personal Communication - Ted Rado, 1996).

No perennial streams, riparian habitat, or wetland areas exist on or adjacent to the Project area (see Section 3.3.1.3). Further, no star dunes, sheet dunes, wind-accumulated sand deposits or other aeolian sand deposits exist within the Project area (Rado, 1995).

3.5.5.1. Special Status Species

A total of ~~twenty-three (23)~~ 22 federal or state listed or proposed T/E plant species; USFWS special status species (e.g., former C2 or C3 candidate species); and BLM sensitive plant species were identified which are known to occur in the general vicinity of the Project area (Rado, 1996). These species are identified in Table 3-7. However, ~~sixteen (16)~~ eleven (11) of these identified plant species do not have potential habitat within the Project area. ~~For example~~ These include: (Pierson's milk-vetch (*Astragalus magdalena* var. *Piersonii*), Algodones Dunes sunflower (*Helianthus niveus* ssp. *tephrodes*), giant spanish needle (*Palafoxia arida* var. *gigantea*), Borrego milk-vetch (*Astragalus lentiginosus* var. *borreganus*), Hardwood's milk-vetch (*Astragulus insularis* var. *harwoodii*), Wiggins cholla (*Opuntia wigginsii*), sand food (*Pholisma sonorae*), and Wiggin's croton (*Croton wigginsii*), which are typically found in sand dunes; rock nettle (*Eucnida rupestris*), which is confined to an isolated occurrence in California located 60 miles west of the Project area; ~~California ditaxis (*Ditaxis california*) is only present in isolated populations in sandy washes;~~ Glandular ditaxis (*Ditaxis clariana*), which is found only in Mojave scrub or Sonoran desert scrub/sandy soils not present on the Project area ~~site~~; and Munz's cholla (*Opuntia munzii*), which is found in lower fans and plains.

Table 3-7: Plant Species of Concern Known to Occur in the Vicinity of the Imperial Project Area

Common Name	Scientific Name	Status[a]
Pierson's milk-vetch	*Astragalus magdalena* var. *Piersonii*	BLM/FPE/SE/CNPS-1B[b]
Borrego milk-vetch	*Astragalus lentiginosus* var. *borreganus*	CNPS-4/SP[b]
Hardwood's milk-vetch	*Astagalus insularis* var. *hardwoodii*	CNPS-2[b]
Ribbed cryptantha	*Cryptantha costata*	CNPS-4/SP

Common Name	Scientific Name	Status[a]
Winged cryptantha	*Cryptantha holoptera*	CNPS-4/SP
Fairy duster	*Calliandra eriophylla*	CNPS-2/SP
Rock nettle	*Eucnida rupestris*	CNPS-2/SP[b]
California ditaxis	*Ditaxis californa*	BLM/USFWS/CNPS-1B[b]
Glandular ditaxis	*Ditaxis clariana*	CNPS-2[b]
Hairy stickleaf	*Mentzelia hirsutissima*	USFWS/CNPS-2/SP
Slender-lobed four o'clock	*Mirabilis tenuiloba*	CNPS-4/SP
Wiggin's cholla	*Opuntia wigginsii*	BLM/USFWS/CNPS-3/SP[b]
Sand food	*Pholisma sonorae*	BLM/CNPS-1B[b]
Foxtail cactus	*Escobaria vivipara* var. *alversonii*	BLM/USFWS/CNPS-1B/SP
Algodones Dunes sunflower	*Helianthus niveus* ssp. *tephrodes*	BLM/USFWS/SE/CNPS-1B/SP[b]
Munz's cholla	*Opuntia munzii*	BLM/USFWS/CNPS-1B/SP[b]
Giant spanish needle	*Palafoxia arida* var. *gigantea*	BLM/USFWS/CNPS-1B/SP[b]
Orocopia sage	*Salvia greatei*	BLM/USFWS/CNPS-1B/SP
Wiggin's croton	*Croton wigginsii*	BLM/USFWS/SR/CNPS-3/SP[b]
~~Algodones creosote bush~~	~~*Larrea tridentat var. arenaria*~~	~~CNPS-2[b]~~
Desert unicorn plant	*Proboscidia althaefolia*	CNPS-4[b]
Thurber's pilostyles	*Pilostyles thurberi*	CNPS-4[b]
Crown-of-thorns	*Koebeslina spinosa*	CNPS-2[b]

[a]Legend:
- FPE: Federal proposed for endangered status
- SE: California state listed as endangered
- SR: California state rare species
- CNPS: California Native Plant Society;
  - 1B - Taxa determined to be rare, threatened or endangered;
  - 2 - Species rare or endangered in California but common elsewhere;
  - 3 - More information on status needed; and
  - 4 - Species of limited distribution.
- SP: California Special Plant
- USFWS: Designated as a Special Status Species by the U.S. Fish and Wildlife Service
- BLM: Designated a BLM Sensitive Species

[b]No potential habitats for species present within the Imperial Project area

The following plant species have geographic ranges and preferred habitats that indicate that they may potentially occur within or near the Project area. Descriptions ~~on~~ of the species ~~and other data~~ are provided below.

Foxtail cactus: Foxtail cactus is a small cactus associated with rocky alluvial slopes and hills. The distribution of the species ranges from approximately western Joshua Tree National Park southeast to the Chuckwalla Mountains of southeastern California (Munz, 1974). In appearance, the foxtail cactus consists of one (1) to a few stems that branch from a common base to a height of about eight (8) inches. The identifying characteristic of this species are the elongated spines that are white at the base, but transitionally change color to red or purple near the tip, giving the plant an appearance like a fox's tail. Flowers are purple to magenta in coloration and bloom in May and June (Munz, 1974; BOR, 1996). The species is threatened by collecting (Skinner and Pavlik 1994).

Ribbed cryptantha: The ribbed cryptantha is a small annual in the Borage family characterized by ashen stems and leaves, with "ribbed" sepals (Jaeger, 1941). Flowers are white, and bloom between April and May. It is uncommonly distributed in California on sandy soils and gravelly alluvial fans in the Colorado Desert between Palm Springs and Yuma below 1,500 feet in habitats dominated by creosote bush (Jaeger, 1941; Munz, 1941).

Winged cryptantha: The winged cryptantha ~~(a.k.a. Winged forget-me-not)~~ is also a small annual in the Borage family, characterized by rough-hairy herbage, and a "completely winged" seed (Jaeger, 1941). The species grows upright and may reach a height of about two (2) feet. White flowers bloom in March-April (Skinner and Pavlik, 1994). It is irregularly distributed from the vicinity of Palm Springs to the Colorado River in California, present in gravelly and rocky habitats dominated by creosote bush below 2,000 feet (Munz, 1974). The winged ~~forget-me-not~~ cryptantha is found in ephemeral stream channels and washes throughout the Colorado Desert, in the eastern Mojave Desert of California and Nevada, and in the Sonoran Desert of Arizona. The plants are not considered "rare" but are uncommon enough that CNPS recommends that their status be monitored. It has been previously recorded during area surveys for other projects in the area (Pritchett, 1984; BLM and County of Imperial, 1995).

Fairy duster: Fairy duster is a low, rounded shrub with dark green acacia-like leaves. Flowers are scarlet and white, and bloom in January through March (Skinner and Pavlik, 1994). It is closely associated with the edges of smaller washes in southeastern California desert regions (Jaeger, 1941). It has been noted during botanical surveys of this general area (Environmental Solutions, 1987; Office of Arid Lands Studies, 1993).

California ditaxis: California ditaxis is a woody perennial herb, approximately eighteen (18) inches in height, associated with sandy washes and canyons distributed between the Santa Rosa Mountains and the southern side of the Eagle

Mountains in Riverside County and San Diego County (Munz, 1974; Skinner and Pavlik, 1994). Distribution of plants appears to be spotty, with fewer than twenty (20) known occurrences, most consisting of few plants (Skinner and Pavlik, 1994). Flowers are white in color. The California Desert Plan (BLM, 1980) records a population of California ditaxis near Picacho Peak, approximately ten (10) miles east of the Project area. This may represent an error, since the record is substantially southeast of the known geographic range (Munz, 1974), and subsequent literature (CNPS, 1988; Skinner and Pavlik, 1993) do not address this locality. California ditaxis was not documented during surveys of the Project area (Rado, 1995), nor in neighboring project sites (Office of Arid Lands Studies, 1992; DeDyker and Associates, 1994). It is considered a "Special Status Species" by the USFWS and is a Category 1B taxon (i.e., plants rare, threatened or endangered in California and elsewhere) by the CNPS (Skinner and Pavlik, 1994).

Hairy stickleaf: This is an annual blazing star, consisting of erect stems rising to ten (10) or more inches in height. The orange-colored flowers bloom in March-April. It is closely associated with coarse rock rubble and rocky slopes in creosote bush habitats below 2,000 feet. The geographic range in California is principally confined to Imperial County and eastern San Diego County. Localities include Box Canyon, Palm Canyon and Mountain Springs grade (Munz, 1974). It has been previously recorded from this general area (CNPS, 1988).

Slender-lobed four o'clock: Slender-lobed four o'clock is a perennial herb, with many branches extending from a base to a height of about 1.5 feet (Jaeger, 1941). Flowers are white and bloom in March through May. The plant is closely associated with rocky slopes below 1,500 feet elevation in creosote bush habitats (Munz, 1974). The geographic range extends from the western edge of the Colorado Desert south into Baja California (Jaeger, 1974).

Orocopia sage: Orocopia sage is a sparsely-distributed spiny-leaved shrub associated with gravelly washes below 600 feet in elevation in the Orocopia Mountains and Chocolate Mountains areas of southeastern California (Jaeger, 1941; Munz, 1974). Its lavender flowers bloom in March to April.

Desert unicorn plant: Desert unicorn plant is a coarse spreading perennial species, associated with creosote bush scrub habitats in Imperial, San Diego and Riverside Counties in California. The geographic range of this taxon also includes portions of Sonora, Mexico; Baja California, Mexico; and the state of Arizona (CNPS, 1988). Flowers are yellow to orange, with maroon streaking on the lower lobe and spotted along the sides of the "throat." It is uncommonly distributed throughout its range, and associated with sandy substrates (Munz, 1974; Hickman, 1993). It was not documented in the Project area during site

surveys (Rado, 1995) and has not been recorded during surveys of the nearby Mesquite Mine (Office of Arid Lands Studies, 1992) or American Girl Oro Cruz Project sites (DeDyker and Associates, 1994). Desert unicorn plant has no federal or state status. It is listed by the CNPS as a List 4 species (i.e., a "watch list" species).

Thurber's pilostyles: Thurber's pilostyles is a stem parasite associated with indigobush (*Dalea*, especially *Dalea emoryi*)(Munz, 1974). Distribution of this plant in California is confined to creosote bush scrub habitats in Riverside, San Diego, and Imperial Counties in California. The geographic range of this plant also includes Arizona, Nevada, Texas, and Baja California (CNPS, 1988; Hickman, 1993). The plant, in appearance, is quite small, with scale-like leaves and flowers. Flowers are brown in coloration and minute in size (Munz, 1974). The preferred host plant species, *Dalea emoryi*, was not documented during surveys of the Project area (Rado, 1995). Thurber's pilostyles has not been documented during surveys of the Mesquite Mine area (Office of Arid Lands Studies, 1992) or the American Girl Oro Cruz Project site (DeDyker and Associates, 1994). Thurber's pilostyles has no federal or state status. It is listed by the CNPS as a List 4 species (i.e., a "watch list" species).

Crown-of-thorns: Crown-of-thorns is a nearly leafless deciduous shrub consisting of pale green, spine-tipped branchlets (Munz, 1974). Flowers are small and greenish white in coloration. The species is present in washes in creosote bush scrub. It has been reported from the Chocolate Mountains in Imperial County (Munz, 1974) east into parts of Sonora, Mexico; Arizona; and Texas (Munz, 1974; Hickman, 1993). In California it is known from fewer than ten (10) occurrences (Skinner and Pavlik, 1994). Crown-of-thorns is highly visible and readily identified in areas where it occurs, but it was not documented during surveys of the Project area (Rado, 1995), or during surveys of the Mesquite Mine area (Office of Arid Lands Studies, 1992) or the American Girl Oro Cruz Project site (DeDyker and Associates, 1994). Crown-of-thorns has been listed by the CNPS as a List 2 taxon (i.e., plants rare, threatened, or endangered in California but more common elsewhere). It is not a federal- or state-listed species.

3.5.5.2. Botanical Survey Findings

Systematic pedestrian botanical surveys of the entire Project area, including the proposed Project mine and process area, access corridor, water well corridors, ~~and~~ alternate transmission line corridor, including buffer areas, were conducted during multiple visits to the Project area in July, August, and September 1994 and in February, April, and May 1995 (Rado, 1995). In addition, incidental observations on sensitive botanical species were made during the pedestrian

biological survey of the existing 34.5 kV transmission line which will be overbuilt (see Section 3.5.6.2). A total of 116 plant taxa were identified within the survey area. This includes a few introduced species of plants, mainly annuals such as mustards and grasses, occurring within the Project area. Plants observed during the surveys were reported as typical of wash and desert scrub plant associations in the Colorado Desert (Rado, 1995). The botanical survey included collection of prior data from the area, California Native Plant Society (CNPS) data (CNPS, 1984; CNPS, 1988), and a review of prior biological survey reports conducted in the general area (Turner et al., 1980; Pritchett, 1984; Kiva Biological Consulting, 1991; Office of Arid Lands Studies, 1993; Environmental Solutions, 1987; BLM, undated; and BLM, 1994b). A detailed summary of the findings and observations made during the botanical surveys is provided in the biological survey report, which is attached as Appendix G.

The biological survey report indicates that no state or federal listed, proposed, or ~~former candidate plant~~ special status species were observed on the survey lands, nor have any state or federal listed, proposed, or ~~former candidate plant~~ special status species been reported to exist within the Project area. A single sensitive plant species, the fairy duster, was observed within the Project area. The presence of fairy duster was common in virtually all of the ephemeral stream channels throughout the Project area. This species was restricted to the ephemeral stream channels, where it was generally present along wash edges and banks. It was most commonly observed in smaller channels which were between approximately two (2) and ~~to~~ eight (~~2~~-8) feet in width. A total of 285 individual plants were observed, and the actual number present within the Project area probably exceeds 500 (Rado, 1996).

One CNPS List 4 (i.e., "watch" list) species, Winged ~~forget-me-not~~ cryptantha, was found in larger stream channels throughout the Project mine and process area. A total of 53 individual plants were observed, and it was assumed that the actual number of plants was higher (Rado, 1996). The plants were distributed along the edges of the larger washes within the Project area.

Foxtail cactus, ribbed cryptantha, California ditaxis, hairy stickleaf, slender-lobed four o'clock, orocopia sage, desert unicorn plant, Thurber's pilostyles, and crown-of-thorns were not documented during biological surveys of the Project area (Rado, 1995).

3.5.6. Wildlife

Wildlife within the vicinity of the Project area is characteristic of the Eastern Colorado Desert (Rado, 1995). Bamberg and Hanne (1995b) roughly estimated that 95 percent of the Project mine and process area is comprised of desert scrub habitat with predominantly scrub vegetation and relatively little succulent vegetation. The remaining estimated 5 percent of the Project mine and process area, restricted to the wash bottoms and neighboring areas, is comprised of tree/shrub vegetation, generally equivalent to microphyll woodland habitat. Independently, Rado (1995) utilized aerial photographs to map the two (2) major habitat associations (see Figure 3-13). Based upon the Rado map, approximately ~~142~~ 140 acres of microphyll woodland habitat exists within the boundaries of the Project mine and process area (about 8.6 percent of the area). This estimate includes both vegetated areas along the banks and slopes of the drainages, and the less vegetated wash bottoms. Microphyll woodland is considered sensitive habitat by the CDFG.

The following common species inhabit or occasionally visit the Project area:

<u>Reptiles</u>: zebra-tailed lizard (*Callisaurus draconoides*), side-blotched lizard (*Uta stansburiana*), western whiptail (*Cnemidophorus tigris*), and desert iguana (*Dipsosaurus dorsalis*);

<u>Birds</u>: Using microphyll woodland habitat - mourning doves (*Zenaida macroura*), Gambels's quail (*Lophortyx gambelii*), Say's phoebes (*Sayornis saya*), and black-tailed gnatcatchers (*Polioptila melanura*);

Using desert succulent scrub habitat - black-throated sparrow (*Amphispiza bilineata*), loggerhead shrike (*Lanius ludovicianus*), and cactus wren (*Campylorhynchus brunnecapillus*);

<u>Raptors</u>: Multiple raptor species would be expected to periodically forage or migrate through the area, including: golden eagle (*Aquila chrysaetos*), red-tailed hawk (*Buteo jamaicensis*), sharp-shinned hawk (*Accipiter striatus*), American kestrel (*Falco sparverius*), prairie falcon (*Falco mexicanus*), northern harrier (*Circus cyaneus*), western screech-owl (*Otus kennicottii*), great horned owl (*Bubo virginianus*), and turkey vulture (*Cathartes aura*).

<u>Mammals</u>: antelope ground squirrel (*Ammospermophilus leucurus*), Merriam kangaroo rat (*Dipodomys merriami*), desert woodrat (*Neotoma lepida*), black-tailed jackrabbit (*Lepus californicus*), deer (*Odocoileus hemionus*), kit fox

(*Vulpes macrotis*), coyote (*Canis latrans*), American badger (*Taxidea taxa*), and wild burro (*Equus asinus*).

3.5.6.1. Species of Concern

A total of ~~sixty-two (62)~~ federal or state listed or proposed T/E wildlife species; USFWS special status species; BLM sensitive species; and/or California species of concern were identified which are known to occur in the general vicinity of the Project area (Rado, 1995). These species are identified in Table 3-8. Thirty-three (33) of these identified wildlife species do not have potential habitat within the Project area. For example, several sensitive species, including: the Andrews' dune scarab beetle (*Pseudocotalpa andrewsi*)~~, flat-tailed horned lizard (*Phrynosoma mcallii*),~~ and Colorado Desert fringe-toed lizard (*Uma n. notata*), are closely associated with fine sand substrates not present in the Project area~~. Other sensitive species, including: burrowing owl (*Athene cunicularia*), prairie falcon, Cooper's hawk (2), Le Conte's thrasher (*Toxostoma lecontei*), and ferruginous hawk (*Buteo regalis*) could possibly use the Project area, but none of these species were observed during the on-site surveys. Another sensitive species, the white-throated woodrat (*Neotoma albigula venusta*), is typically found in areas with large mesquite hummocks or dense stands of beavertail cactus, none of which are located within the Project area~~ (Rado, 1995).

Table 3-8: Wildlife Species of Concern Known to Occur in the Vicinity of the Imperial Project Area

Common Name	Scientific Name	Status[a]
Alkali skipper	*Pseudocopaedes eunus eunus*	BLM/USFWS[b]
Cheeseweed owlfly	*Oliarces clara*	BLM/USFWS
Andrews' dune scarab beetle	*Pseudocotalpa andrewsi*	BLM/USFWS[b]
Brown-tassel trigonoscuta weevil	*Trigonoscuta brunnotasselata*	BLM/USFWS[b]
Desert pupfish	*Cyprinodon macularius*	BLM/FE/SE[b]
Razorback sucker	*Xyrauchen texanus*	BLM/FE/SE[b]
Flannelmouth sucker	*Catastomus latipinnis*	BLM/USFWS[b]
Roundtail chub	*Gila robusta*	BLM/USFWS[b]
Colorado squawfish	*Ptychocheilus lucius*	FE/SE[b]
Arizona southwestern toad	*Bufo microscaphus microscaphus*	BLM/USFWS/CSC[b]
Yavapai leopard frog	*Rana yavapaiensis*	BLM/USFWS[b]

Common Name	Scientific Name	Status[a]
Couches' spadefoot toad	*Scaphiopus couchi*	BLM/USFWS/CSC[b]
Desert tortoise	*Gopherus agassizii*	BLM/FT/ST
Flat-tailed horned lizard	*Phrynosoma mcallii*	BLM/FPT/CSC
Chuckwalla	*Sauromalus obesus*	BLM/USFWS
Colorado Desert fringe-toed lizard	*Uma notata notata*	BLM/USFWS/CSC[b]
Bald eagle	*Haliaeetus leucocephalus*	BLM/SE/FE[b]
Brown pelican	*Pelecanus occidentalis*	BLM/FT/ST[b]
Peregrine falcon	*Falco peregrinus*	BLM/USFWS/FE/SE
Yuma clapper rail	*Rallus longirostris yumanensis*	BLM/FE/SE[b]
Aleutian Canada goose	*Branta canadensis leucopareia*	BLM/FT/ST[b]
Southwestern willow flycatcher	*Empidonax traillii extimus*	BLM/FPE/SE[b]
Arizona Bell's vireo	*Vireo bellii arizonae*	BLM/SE[b]
Western yellow billed cuckoo	*Coccyzus americanus occidentalis*	SE[b]
California black rail	*Laterallus jamaicensis coturniculus*	BLM/USFWS/ST[b]
Black tern	*Chilodonias niger*	BLM/USFWS/CSC[b]
Burrowing owl	*Athene cunicularia*	BLM/USFWS/CSC
LeConte's thrasher	*Toxostoma lecontei*	CSC
Golden eagle	*Aquila chyrsaetos*	CSC
Prairie falcon	*Falco mexicanus*	CSC
Ferruginous hawk	*Buteo regalis*	BLM/USFWS/CSC
Sharp-shinned hawk	*Accipiter striatus*	CSC
Northern harrier	*Circus cyaneus*	CSC
Cooper's hawk	*Accipiter cooperii*	CSC
Large-billed savannah sparrow	*Passerculus sanwichensis rostratus*	BLM/USFWS/CSC[b]
Loggerhead shrike	*Lanius ludovicianus*	BLM/USFWS/CSC
Black-tailed gnatcatcher	*Polioptila melanura*	CSC
Long-eared owl	*Asio otus*	CSC
Barn owl	*Tyto alba*	CSC
Elf owl	*Micrathene whitneyi*	SE[b]
Gila woodpecker	*Melanerpes uropygialis*	BLM/USFWS/SE
Mountain plover	*Charadrius montanus*	BLM/USFWS[b]
Western least bittern	*Ixobrychus exilis hesperus*	BLM/USFWS/CSC[b]
White-faced ibis	*Plegadis chihi*	BLM/USFWS/CSC[b]
Crissal thrasher	*Toxostoma dorsale*	CSC

Common Name	Scientific Name	Status[a]
Vaux's swift	*Chaetura vauxi*	CSC
Gilded northern flicker	*Colaptes auratus chrysoides*	SE[b]
California leaf-nosed bat	*Macrotus californicus*	BLM/USFWS/CSC
Greater western mastiff bat	*Eumops perotis californicus*	BLM/USFWS/CSC
Occult little brown bat	*Myotis lucifugus occultus*	BLM/USFWS/CSC
Spotted bat	*Euderma maculatum*	BLM/USFWS/CSC
Small-footed myotis	*Myotis ciliolabrum*	BLM/USFWS
Yuma myotis	*Myotis yumanensis*	BLM/USFWS
Cave myotis	*Myotis velifer*	BLM/USFWS/CSC
Desert pallid bat	*Antrozous pallidus pallidus*	CSC
Townsend's big-eared bat	*Plecotus townsendii*	BLM/USFWS/CSC
Yuma hispid cotton rat	*Sigmodon hispidus eremicus*	BLM/USFWS/CSC[b]
White-throated woodrat	*Neotoma albigula venusta*	BLM/USFWS/CSC
Colorado River cotton rat	*Sigmodon arizonae plenus*	BLM/USFWS/CSC[b]
Yuma puma	*Felis concolor browni*	BLM/USFWS/CSC
American badger	*Taxidea taxus*	CSC
~~Desert bighorn sheep~~	~~*Ovis canadensis nelsoni*~~	~~BLM[b]~~

[a]Legend:
FE: Federal listed as endangered
FPE: Federal proposed for endangered status
FT: Federal listed as threatened
FTE: Federal proposed for threatened status
SE: California state listed as endangered
ST: California state listed as threatened
SP: California Special Plant
BLM: Designated a sensitive species by the U.S. Bureau of Land Management
USFWS: Designated a special status species by the U.S. Fish and Wildlife Service
CSC: California species of concern
[b]No potential habitats for species present within the Imperial Project area

The following wildlife species have geographic ranges and preferred habitats that indicate that they may potentially occur on or near the Project area. Descriptions of the species, together with results of ~~site~~ ~~historic~~ surveys, ~~and other data,~~ are provided below.

Cheeseweed owlfly: The cheeseweed owlfly is closely related to lacewings, antlions, and fishflies in the insect order Neuroptera. It is approximately

1.5 inches in length and resembles a large winged termite. Eggs are laid and hatch in the soil. Larvae burrow into the soil and attach to roots of their host plant, creosote bush. Adults emerge from the soil between March and May, in aggregations that are short-lived, typically less than four (4) days in duration (Faulkner, 1990). The emergence of adults for breeding does not follow a regular pattern, but is dependent upon preceding winters of high precipitation; during dry years no emergence may occur (Faulkner, 1990).

The distribution of this species in the deserts of southeastern California, southern Nevada and western Arizona is not well understood. Widely dispersed locality records and the wide distribution of the host plant, creosote bush, suggest that the species is difficult to document due to its unpredictable and short-duration emergences as an adult (BOR, 1996). Locality records are widely dispersed, and include the vicinity of Mecca (California), near Parker (Arizona), the Gila Mountains (Arizona), Boulder City (Nevada), Telegraph Pass (Arizona), Black Mountain (California), along the road between Rice and Blythe (California), and the vicinity of Palm Springs (California) (BOR, 1996). There is no text in the literature identifying the species as rare and, given the huge range of locality records for its host plant, the species could actually be common, but because of its irregular emergence pattern it is difficult to observe. The species was originally listed as a Category 2 species (i.e., more information is needed), and it is currently considered a special status species by the USFWS and a sensitive species by the BLM (Personal Communication - Ted Rado, 1996).

Flat-tailed horned lizard: The flat-tailed horned lizard is a medium-sized horned lizard, approximately six (6) inches in total length, that ranges from southeastern California into extreme southwestern Arizona and Sonora, Mexico. Coloration is usually whitish, with a narrow dark stripe extending down the center of the back. A series of six (6) elongated head scales, typical of the genus, are located at the base of the skull. The centermost of these head spines (called occipital horns) are unusually elongate~~,~~ and, together with the long flattened tail and center dark dorsal stripe, distinguish this horned lizard species from other members of the genus (Smith, 1967).

The flat-tailed horned lizard is principally associated with sandy habitats, often interspersed with harder soils that ~~allow~~ support colonies of harvester ants, a primary food source for this lizard (CDFG, 1991). The flat-tailed horned lizard is generally considered to be difficult to locate, and relatively rare throughout its geographic range (Norris, 1949; Klauber, 1939). Regional surveys to determine relative abundance and distribution have confirmed this scarcity (Turner et al, 1978, 1980b), and also suggest declines where prior researchers have documented relatively high abundance, such as at the Algodones Dunes (Mayhew, 1965).

In California, the geographic range of the flat-tailed horned lizard extends over approximately 2,700 square miles. A total of 330 square miles of this area, located in the East Mesa and Yuha Basin of central Imperial County, have been identified as optimal habitat for this species (Turner et al., 1980b; Rado, no date). A series of analyses of effects to flat-tailed horned lizards and habitats have been undertaken. Rado (no date) initially reviewed factors such as agricultural development, pesticide spraying, recreational use, and mineral development within both optimal habitat and the geographic range of this species. He concluded that 52 percent of the geographic range of the flat-tailed horned lizard in California is within areas subject to one (1) or more use-oriented activities, and that this included 57 percent of optimal habitat for the species. Subsequent re-evaluation in 1986 concluded that one (1) or more use-oriented activities were occurring on 95 percent of flat-tailed horned lizard optimal habitat (Mayhew and Carlson, 1986). Repeat surveys on flat-tailed horned lizard optimal habitat on Bureau of Land Management lands at East Mesa and Yuha Basin have also recorded declines in relative abundance in both areas (Olech, no date). The documented scarcity of this species, high degree of threats to habitat, and documented declines in populations have resulted in the proposal to list the flat-tailed horned lizard as a threatened species (58 Federal Register 62624-62629).

Nearest locality records to the ~~Chemgold Imperial Project site~~ Project mine and process area are from the vicinity of Ogilby (Townships 15 and 16 South, Range 20 East), located approximately ten to twelve (10-12) miles south-southwest along the eastern edge of the Algodones Dunes (Bolster, 1989). Turner et al. (1980a), completing a range-wide inventory of Public Lands administered by the BLM for the flat-tailed horned lizard, did not document the species within any Townships encompassing the Project area. Reasons for this apparent absence probably relate to substrate. The Project mine and process area, the Project ancillary area, ~~access route leading to this site from Ogilby Road,~~ and transmission line corridor consist of desert pavement, coarse gravel, and compacted gravelly sands not occupied by this species. Jennings and Hayes (1994), in a comprehensive overview for the California Department of Fish and Game, state that the flat-tailed horned lizard "...is a specialized sand-dweller that has not been observed outside of areas with a shifting sand substrate." Most records for flat-tailed horned lizards come from the creosote (*Larrea tridentata*) white bursage (*Ambrosia dumosa*) series of Sonoran desert scrub (Turner and Brown, 1982). It is this open community in association with sandy flats and valleys that is often described as flat-tailed horned lizard habitat (Stebbins, 1985; Turner and Medica, 1982; Rorabaugh *et al.*, 1987). Although most records for the species are from sandy flats or areas with a veneer of fine, windblown sand, the flat-tailed horned lizard has also been collected or observed in areas with little or no windblown sand, such as badlands in the Yuha Basin and the Borrego

Valley, and on saltbush flats at the northeastern end of the Salton Sea (Turner *et al.*, 1980). The species has also been recorded in the mixed scrub series of Sonoran desert scrub (Turner and Brown, 1982), on gravelly soils in Anza-Borrego Desert State Park, and in association with senita cactus (*Lophocereus schotti*) in Sonora, Mexico. Flat-tailed horned lizards are probably absent or rare in the unvegetated portions of major dune systems, such as the Algodones Dunes and the dunes of the Gran Desierto (Luckenbach and Bury, 1983; McCalvin, 1993).

Chuckwalla: The chuckwalla is a large robust nonvenomous lizard species closely associated with rock outcrops and rock crevices in the Mojave, Colorado, and Sonoran deserts (Stebbins, 1966). Total length in males may approach eighteen (18) inches. Overall body shape is flattened, with loose skin folds on the sides, and a large fleshy tail used to store fat. Scalation consists of many fine scales, giving the skin a sand-paper texture. Food consists of a variety of plants including the flowers of creosote bushes. Coloration is highly variable, and usually approximates that of the rock outcrops inhabited by a particular population. Typically the body is dark, with a lighter tail (Miller and Stebbins, 1964; Stebbins, 1966; Smith, 1967).——

Desert tortoise: The desert tortoise is widely distributed over portions of the Mojave, Sonoran, and Colorado deserts of the western United States and northwestern Mexico. Habitats occupied include plains and valleys in the Mojave Desert, bajadas and low mountain slopes in the Sonoran Desert, and thorn scrub forest in Mexico. Dominant vegetation includes creosote bush, burrobush, Joshua trees, ocotillo, palo verde, and several species of saltbush (Woodbury and Hardy 1948; Schwartzmann and Ohmart, 1977; Berry, 1975 and 1984). Critical habitat for the species has been identified by the USFWS, and the BLM has established Desert Wildlife Management Areas (DWMA's) as part of the Desert Tortoise (Mojave Population) Recovery Plan (1994). The nearest desert tortoise critical habitat to the Project area is the Chuckwalla Unit, the southern end of which is located approximately two (2) miles northwest of the Project mine and process area (see Figure 3-12).

The desert tortoise is a highly adapted, adept digger. Burrows are constructed to avoid harsh temperatures and to avoid predators. Burrows used by tortoises include a shallow "pallet" that is used regularly during seasonal activity periods, and a deeper, more extensive burrow that is used during periods of inactivity (Woodbury and Hardy, 1948; Berry, 1975). Burrows may be constructed almost anywhere, including under boulders, canopies of shrubs, wash embankments, or in the open (Woodbury and Hardy, 1948; Berry, 1972; Burge and Bradley, 1976; Coombs, 1977).

The species is herbivorous. Tortoises eat a variety of annual flowers, perennial grasses, a few half shrubs, and flowers of perennial shrubs. Desert tortoises also rely heavily on intermittent rainfall to re-hydrate, and will emerge in numbers immediately following the onset of spring and summer rains to drink (Medica et al., 1982).

Desert tortoises are mature at approximately 15-20 years of age (Woodbury and Hardy, 1948). One to two (1-2) clutches of 2-14 eggs are laid during the spring or early summer in or near the females burrow (Miller, 1955; Turner et al., 1987). Eggs hatch in about 105-135 days (Coombs, 1977). Individual animals may live for over 100 years (Woodbury and Hardy, 1948).

Desert tortoise populations have declined in recent years as a consequence of several factors. Man-induced activities, including urbanization, highway construction, livestock grazing, motorized recreation, utility and pipeline corridors, mineral exploration and development, and energy development, have contributed to habitat loss and degradation (Berry, 1984). Populations have also suffered major declines as a result of disease outbreaks and excessive predation by ravens, a major predator of juvenile tortoises (~~US~~BLM et al., 1989).

American peregrine falcon: The American peregrine falcon is a large falcon, with narrow, pointed wings that extend to a total length of about 40 inches. Adults are bluish in coloration above and light-buff below. The head is very dark, with a "cap" that extends on both sides to well below the eyes. Peregrine falcons feed entirely on other birds that are caught in the air. The species suffered precipitous declines attributed principally to nest failure as a result of pesticide (e.g., DDT) effects (CDFG, 1991; BioSystems, 1991; BOR, 1996). The American peregrine falcon is currently listed as endangered by the State of California and the federal government.

Preferred habitat typically consists of cliff faces near optimal foraging habitat, usually close to rivers, lakes, or streams (BOR, 1996). Surveys of the lower Colorado River system during 1990 did not document nesting activities south of Lake Mohave; however, potential peregrine falcon nesting habitat exists in a narrow series of steeply rising bluffs bordering the lower portion of the Colorado River ~~along the lower portion of the Colorado River~~ in Topock Gorge and near Bill Williams delta (BOR, 1996). The Project area does not lie within the identified breeding range of the American peregrine falcon (BioSystems, 1991).

Golden eagle: The golden eagle favors mountainous and hilly terrain with open country for foraging. This large raptor can have a wingspan up to 6.5 feet and weigh as much as 14 pounds (BioSystems, 1989). Adult birds are mainly dark

brown, with immature birds showing some white plumage. All ages possess golden feathers on the head and shoulder region. This species feeds on a variety of mammals, snakes and other birds and carrion. Golden eagles nest in large trees, cliffs, escarpments and occasionally on transmission towers. Golden eagles are relatively rare in the Colorado Desert ~~and along the Colorado River, where they are infrequent winter visitors~~ (Garrett and Dunn, 1981).

Northern harrier: The northern harrier is distinguished by its owl-like facial disk and white rump patch. Males are generally gray above, white below with black wing tips, while females are brown above and white below with heavy brown streaking (National Geographic Society, 1987). Harriers usually fly very close to the ground when foraging for prey such as amphibians, reptiles, small birds and mammals. This species is most common in the vicinity of wetlands and agricultural areas, but can be observed in ~~open~~ sparsely vegetated areas and the desert while migrating. In the winter, this species can be observed along the Colorado River and in agricultural areas of the desert.

Miller and Stebbins (1964) record this species as an infrequent migrant in Joshua Tree National Park. Weathers (1983) also records it as a migrant in Deep Canyon, near Palm Springs. The species has also been reported from the Algodones Dunes, about fifteen (15) miles west of the Project area, between the months of January and April (BLM records).

Ferruginous hawk: The ferruginous hawk derives its common name from its rust-colored back and shoulder regions, that contrast sharply with its mainly white underparts. This is one of the largest hawks in the United States that favors open dry country. In southern California this species is a winter visitor, typically arriving in early fall and departing in early spring. Ferruginous hawks can be observed in the vicinity of grassland and agricultural areas in the desert, but are rather rare and uncommon near the Colorado River (Garrett and Dunn, 1981). Ferruginous hawks have been reported in the vicinity of the Coachella and All American Canals between the months of January and April (BLM records). This species is a California Species of Concern as a wintering bird in southern California.

Sharp-shinned hawk: The sharp-shinned hawk is a small raptor distinguished by its small size and square-tipped tail. Coloration on the back is charcoal to brownish, with a lighter colored breast mottled with reddish brown streaks or bars. The long tail is distinctly banded. It feeds on a variety of other birds, including juncos and warblers (Weathers, 1983). Geographic range for this species is extensive, and includes most of California.

Within the Colorado and Mojave Desert, sharp-shinned hawks are uncommon winter residents. Miller and Stebbins (1964) note occurrences of this species at Joshua Tree National Park between October and February. Weathers (1983) has noted it as an "uncommon migrant" in Deep Canyon near Palm Springs. It has also been recorded from eight (8) miles east of Picacho (about twenty (20) miles east of the Project area; BLM data).

Burrowing owl: -The burrowing owl is an owl of ~~open undeveloped country~~ sparsely vegetated habitats but also frequents golf courses, abandoned agricultural fields, road cuts and airports. Although nocturnal, it commonly perches conspicuously during daylight hours at the entrance to its burrow or on some low post. These small owls feed on insects, small birds, and mammals. Burrowing owls usually nest in single pairs or as small colonies, and utilize abandoned mammal burrows or rarely burrows that they construct for themselves for nesting and shelter. This species is common in the ~~Imperial Valley and in~~ agricultural areas of Imperial Valley and near the Colorado River (BioSystems, 1989). Burrowing owls are considered California Species of Concern~~ when nesting~~.

Cooper's hawk: The Cooper's hawk is an uncommon bird often associated with open woodlands. It is slightly larger in size than a sharp-shinned hawk and similarly colored, with a strongly barred and rounded tail. Food consists of a variety of birds and small mammals (Weathers, 1983). Weathers (1983) notes that Cooper's hawks are uncommon throughout the year in Deep Canyon, with numbers increasing during the winter months. Miller and Stebbins (1967) also record it as an uncommon winter visitor at Joshua Tree National Park, with park records between August and November. The species has been recorded from January in the Algodones Dunes, approximately twenty (20) miles southwest of the Project area (BLM records).

Long-eared owl: Long-eared owls are medium-sized owls, distinguished by long prominent feather "tufts." It is widely distributed across the Northern Hemisphere. The plumage is intricately patterned, with mottling of grey, black and white feathers dorsally and a series of brown and grey streaks and bars ventrally. Prey includes a variety of small nocturnal mammals. Miller and Stebbins (1964) record it as "rare" in Joshua Tree National Park. It has been reported from "Glamis Forest" in Township 13 South, Range 18 East, approximately twenty (20) miles west of the Project area (BLM data).

Prairie falcon: The prairie falcon is a large falcon, with a brownish dorsal coloration with a light breast stippled with brown and black. Wingspan is about 30 inches. Primary prey includes other birds, although small mammals may also be eaten. Nesting occurs typically on cliff edges, cliff faces, or in potholes on

precipitous slopes, usually at a height of 30 or more feet above ground level. The range of this species in the California deserts is extensive, and includes virtually the entire Colorado Desert. It is intolerant of disturbance during nesting, and nests may be abandoned as a result of human intrusion (BioSystems, 1989; Weathers, 1983).

Barn owl: The barn owl is a medium-size owl with a widespread distribution across the northern hemisphere. -Dorsal coloration is light brownish. Ventral coloration is off-white, with darker fine stippling. The face is distinctly "heart-shaped," with small dark eyes. Legs are distinct and long. Barn owls forage for mice from mine shafts and tunnels, natural caves and rock fissures, and abandoned buildings. Eggs are laid at approximately two (2)-day intervals, resulting in nests comprised of several young of differing size. Young fledge in about 60 days (Weathers, 1983). The distribution within the California deserts is extensive. Barn owls have been reported from agriculturally developed areas around El Centro, and from creosote bush scrub habitats in the Algodones Dunes area, approximately fifteen (15) miles west of the Project area (BLM data).

Loggerhead shrike: The loggerhead shrike is a species that can be found in both open or brushy country, from desert to coastal habitats. Loggerhead shrikes are strikingly marked grayish white and black birds with a conspicuous dark eye "mask." This bird is often observed perched on some form of "lookout" (e.g., tree limb, fence post, ocotillo, etc.), from which it will dive on prey. Prey, consisting of insects, reptiles and small mammals, is often impaled on some sharp object (e.g., thorns, barbed wire, etc.) and left for future consumption. The loggerhead shrike is ~~common in open areas~~ found in shrub habitats throughout California.

Arizona Bell's vireo: The Arizona Bell's vireo is a subspecies of Bell's vireo with isolated willow-mesquite habitat in California in the vicinity of Needles and the Laguna Dam along the Colorado River (CDFG, 1991). Plumage of this small species is grayish above and whitish below. The species is generally indistinct and hard to identify when not singing. Bell's vireo song is distinct among vireos. Prey consist of insects, spiders, and fruits. The subspecies is endangered in California due to loss of riparian habitat and the invasion of remaining habitat fragments by brown-headed cowbirds which parasitize this vireo's nests. A single Bell's vireo was observed in Tumco Wash, approximately ten (10) miles south of the Project mine and process area during a biological survey in 1992 (Western Resource Development, 1993).

Black-tailed gnatcatcher: The black-tailed gnatcatcher is blue-gray above, and grayish white below. The outer tail feathers are mostly black with some white

markings below. A common resident of the Colorado Desert, it is found in the catclaw acacia-smoke tree vegetation of the southeastern deserts. Prey consists of a variety of insect species. This species is a common resident along the Colorado River, but it tends to avoid agricultural areas and tamarisk groves (Garrett and Dunn, 1981). Its geographic range extends from southern Inyo County to the United States-Mexican border in the United States. The close association of this species with wash vegetation has been noted by Miller and Stebbins (1964) and by Weathers (1983).

LeConte's thrasher: LeConte's thrasher is a pale grayish-brown thrasher that is lighter in coloration than other thrasher species. Other distinguishing field marks include dark eyes, bill and tail. LeConte's thrashers prefer arid, sparsely vegetated habitats (e.g., desert washes and flats) in both the Mojave and Colorado Deserts of California. This bird is uncommon throughout most of its range. LeConte's thrasher is absent from the irrigated portions of the Imperial Valley and the Colorado River, but it breeds in drier habitats outside of these areas (Garrett and Dunn, 1981).

The LeConte's thrasher has been previously recorded from the general vicinity of the ~~project site~~ Project area (CNDDB records). Prior records include drainages in Sections 11 and 28 of Township 14 South, Range 20 East, located west of the ~~Imperial~~ Project ~~site~~ area (BLM data).

Gila woodpecker: The gila woodpecker is a large woodpecker with grayish-brown overall coloration. The back is barred with black and white. In flight, there is also a white patch on each wing, and the tail is barred with black and white. Principal food includes other bird eggs, vegetable and fruit material, and insects (CDFG, 1991).

Gila woodpeckers are cavity nesters that prefer mature cottonwood and willow trees within riparian habitats. Although originally ranging along the lower Colorado River in California, the species is currently restricted to isolated disjunct occurrences between Needles and Yuma. Currently, about 200 individual birds are known to occur in this area (CDFG, 1991). The gila woodpecker has been listed as endangered in California as a result of habitat loss and degradation and from nest competition with the introduced European starling (Sturnis vulgaris). General area records include eight (8) miles east of Picacho (twenty (20) miles east of the Project) and Blythe (35 miles northeast of the Project) (BLM data).

Crissal thrasher: The crissal thrasher is a medium-sized songbird, distinguished by its downward-curved bill and rusty-colored undertail. Overall coloration is brown. The species is closely associated with densely vegetated canyons and

desert washes (Robbins, 1996; Weathers, 1983). The crissal thrasher has been previously recorded from Indian Wash, where an estimated three (3) breeding pairs were recorded during June 1977 (CNDDB records).

Vaux's swift: The Vaux's swift is a small streamlined bird adapted for highly maneuverable flight. Coloration is charcoal above and pale gray and white below. This species migrates extensively. Vaux's swifts breed from southeastern Alaska south to central California, and in southern Mexico south to Panama (Niller and Stebbins, 1964). The nearest breeding areas to the Project area are in the Sierra Nevada of central California (Personal Communication - Peter Woodman). Vaux's swift appear in southern California as spring and fall migrants, typically flying in small groups of one (1) to as many as fifteen (15) individuals. Miller and Stebbins (1964) cite several records of small groups of migrating birds in Joshua Tree National Park during the months of April-May and again in September.

White-throated woodrat: The white-throated woodrat is a stocky-shaped medium-sized rodent, with a total length of about fifteen (15) inches. The body plan for this species is highly generalist. The tail, comprising about half of this length, is grayish above and white below. The belly is whitish. The dorsal coloration is grayish intermixed with dusky hairs. This subspecies is distinguished by all others by the throat region, where hairs are pure white to their roots (Ingles, 1965). The geographic distribution of the subspecies *venasta* of the white-throated woodrat ranges roughly from southwestern and west-central Arizona west into extreme southeastern California, to the vicinity of Borrego Springs (Hall, 1981). Associated habitats often include mesquite woodland (Ingles, 1965) and large patches of beavertail cactus (Williams 1986). Large quantities of dead trees enhance woodrat populations by providing nest material and cover (Personal Communication - Nancy Nicolai, BLM, 1996). ~~Localized~~ Local records include the vicinity of Glamis (fifteen (15) miles west of the Project area) and Pilot Knob (fifteen (15) miles south of the Project area).

Yuma puma: The Yuma puma is a narrowly-distributed light race of the mountain lion restricted to the lower Colorado River drainage. This is a large feline, with a total length of about six to eight (6-8) feet, including an approximately three (3)-foot long tail. General coloration on this race is very pale above and whitish below. Prey includes burro deer, rodents, and rabbits (Williams, 1986). Grinnell (1933) noted that they were associated with dense "bottomland" vegetation along the Colorado River and nearby rocky uplands. Very little is known about the population status of this race and its ecology. Records proximate to the Project area include twelve (12) miles north of Yuma (1903 record), twenty (20) miles north of Picacho (no date), and sightings from

the Imperial National Wildlife Refuge during the 1940's (Williams, 1986). The Project area lies near the western edge of the historical range of the Yuma puma. A contract survey conducted for the USFWS in the 1980's to collect recent possible sightings of the Yuma puma did not result in any new records. There are unconfirmed reports of mountain lions in the Picacho Recreation Area, principally reported to the CDFG by deerhunters (Personal Communication - Rusty McBride, CDFG, 1995). More recently, a critical review of the status of the Yuma puma was undertaken (McIvor, *et al*, 1994). Much confusion exists over the taxonomic status of the Yuma puma, as well as the viability of a population of mountain lions along the Lower Colorado River. ~~It is uncertain if the Yuma puma deserves its subspecific taxonomic status, and based~~ Based on available information, it was concluded that *Felis concolor brownii* does not deserve subspecific designation. Nevertheless, a population of mountain lions does exist along the Lower Colorado River, and the greatest threat to their survival appears to be loss of habitat, particularly riparian and wetland communities, as it relates to loss of prey species, especially deer herds. ~~There are unconfirmed reports of mountain lions in the Picacho Recreation Area, principally reported to the California Department of Fish and Game by deerhunters (Personal Communication - Rusty McBride, CDFG).~~

<u>American badger</u>: The American badger is widely distributed across the west-central Canada, the western United States, and northern Mexico. Habitats occupied include deserts, plains, foothills, and mountain valleys. The badger is characterized as a short, stout predator, with powerful forelegs and claws for digging out its rodent prey. Coloration is brownish or grayish dorsally, with a striking black-and-wide striping across the face. The ears are small and tail short (Ingles, 1965; Burt and Grossenheider, 1964). Overall length is about 28 inches, and weight about twenty (20) pounds. Messick (1987) cited studies documenting home ranges of American badgers of about 1,400 acres and 2,100 acres.

<u>California leaf-nosed bat</u>: The California leaf-nosed bat is a medium-sized species distinguished by its combination of large ears and vertical "leaf-like" projection on its nose. The species is distributed in southern California, extreme southern Nevada and western and southern Arizona (Burt and Grossenheider, 1964). It is closely associated with mine shafts and tunnels (Brown, 1989 and 1993). Leaf-nosed bats forage primarily along microphyll washes for their insect prey, that includes grasshoppers, beetles and moths. Brown (1992 and 1994) captured and telemetered California leaf-nosed bats during studies in the Cargo Muchacho Mountains, about five (5) miles south of the Project mine and process area. She noted that most foraging occurs within a one (1)-mile radius of the roost site, with forays to a five (5)-mile radius during warm months.

Greater western mastiff bat: The greater western mastiff bat is characterized by its free tail and comparatively large size from other bats in the Project area. Coloration is a deep brown. The geographic range of this species extends from central California south and east into northern Mexico (Burt and Grossenheider, 1964; Hall, 1981). Habitat for roosting consists of large cracks in exfoliating slabs of granite or sandstone that open downward, typically on cliffs (Williams, 1986). Williams (1986), overviewing the status of this species, mentions severe declines for largely unknown reasons.

Spotted bat: The spotted bat is a medium-sized species distinguished from other bats by the three (3) large distinctly patterned light spots on its torso and its large ears. The geographic range of this bat is very extensive, including central Montana, across the Great Basin, Mojave, Sonoran and Chihuahuan Deserts into central Mexico (Hall, 1981). Very little is known ~~on~~ of the life history of this species. Miller and Stebbins (1964) mention a record from Twentynine Palms. Brown (1992 and 1993), during surveys in the Cargo Muchacho Mountains, may have heard this species.

Townsend's big-eared bat: This is a medium-sized bat with extremely large ears joined across the forehead. Two prominent lumps are also present on the nose. Coloration is olive-brown (Burt and Grossenheider, 1964). The geographic range extends from over much of the western United States into central Mexico (Hall 1981). Known roosting sites in California include caves, mine tunnels, and abandoned buildings. Food consists of a variety of insects. The species is extremely intolerant of disturbance, and even a single visit into a roosting sites may cause these bats to abandon the site (Williams, 1986).

Yuma myotis: This is a small myotis characterized as having its interfermoral membrane haired almost to its knees. Coloration is brownish. It roosts in colonies in caves, tunnels and abandoned buildings in arid areas. The U.S. Bureau of Reclamation, overviewing its biology, mentions a close association with water (BOR, 1996). The geographic range extends from southwestern Canada across the western United States into northwestern Mexico (Hall, 1981).

Cave myotis: The cave myotis is a comparatively large bat identified by a wing membrane that extends to its toes. Coloration is dull brown (Burt and Grossenheider, 1964). Roost sites include caves, tunnels, mine shafts and under bridges (BOR, 1996). The geographic distribution of the cave myotis extends from the central Oklahoma area through most of Arizona and southwest Texas west into extreme southeastern California and south through most of Mexico (Hall, 1981). California records include the Riverside Mountains, 35 miles north of Blythe, and the vicinity of Needles (Hall, 1981). Brown (1995), evaluating the

possible use of the Project area by cave myotis, estimated a low potential for roosting and a medium potential for foraging.

Small-footed myotis: The small-footed myotis is one of the smallest bat species in the United States. It is distinguished by yellowish long silky fur and a black mask across the face. Roosting sites include caves, tunnels, rock crevices and forested areas (Burt and Grossenheider, 1964). The geographic range is extensive, and includes western Canada, south into the southwestern United States into northwestern Mexico (BOR, 1996).

Occult ~~myotis~~ little brown bat: The occult ~~myotis~~ little brown bat is a small bat species characterized by hairs on its back that have glossy tips, giving the pelage a glossy sheen. Roosting sites include caves, mine shafts and tunnels, hollow trees, and buildings (Burt and Grossenehider, 1964). The geographic range of this ~~race~~ subspecies of little brown bat extends from extreme southeastern California east into western New Mexico, then south into central Mexico (Hall, 1981). California records include Ripley, five (5) miles south of Blythe, and the Riverside Mountains (Hall, 1981).

~~Pallid~~ Desert pallid bat: The pallid bat is a medium-sized bat identified by its large ears and yellowish fur. Roosts include rock crevices, caves, mine tunnels, buildings and trees (Burt and Grossenheider, 1964). The geographic range of the *pallidus* ~~race~~ subspecies ranges from northern Utah and Colorado south into central Mexico and west into extreme southeastern California. California records include Indian Cove and Cottonwood Spring at Joshua Tree National Park (Miller and Stebbins, 1964).

3.5.6.2. Biological Survey Findings

~~A systematic~~ Systematic biological surveys ~~was~~ were conducted coincident with the botanical site surveys in July, August, and September 1994; and February, April and May 1995~~.~~ for the entire Project area, including the proposed Project mine and process area, access corridor, water well corridors, and alternate transmission line corridor, including buffer areas (Rado, 1995). A 120-foot wide corridor centered on the existing 34.5 kV transmission line which will be overbuilt was also surveyed along the entire length of the transmission line during August and September, 1994 (Rado, 1996). The biological survey also included collection of prior data for the area from other sources, including: the CNDDB for the Hedges and Ogilby USGS 7.5 minute quadrangles; discussion with Chemgold staff; and review of prior biological survey reports conducted in the general area (Turner et al., 1980; Environmental Solutions, 1987; Kiva Biological Consulting, 1991; Western Resource Development, 1993; WESCO,

1992; Office of Arid Land Studies; Karl, 1994; BLM, undated; and BLM, 1994b). Target species investigations were also conducted as part of the biological survey. Target species investigations included: supplemental bird surveys conducted within the Project ~~mine and process~~ area ~~and Indian Pass Road~~ in July 1994 and February, March, and April 1995; rodent live trapping conducted within the Project mine and process area in August 1994; and deer habitat evaluations conducted within and surrounding the Project ~~mine and process~~ area ~~and Indian Pass Road~~ in September 1994 (Rado, 1995) and July 1995 (Krausman, 1995). The observations and findings made during the biological surveys~~,~~ are provided in appendices to this EIS/EIR and are briefly summarized below.

Wildlife species and sign observed during site surveys included eighteen (18) reptiles, 44 birds, and sixteen (16) mammals. With the exception of the desert tortoise and chuckwalla, all reptile species are common, widely distributed, and lack special management status. Bird species observed included year-round residents, such as Gambel's quail (*Lophortyx gambelii*), as well as seasonal migrants, such as white crowned sparrows (*Zonotrichia leucophrys*) (Rado, 1995).

Mammals include a variety of rodents. Livetrapping results indicate that the dominant rodent species are the Merriam kangaroo rat (*Dipodomys merriami*) and the desert woodrat (*Neotoma lepida*). Larger mammals include such predators as ~~Kit~~ kit fox (*Vulpes macrotis*) and coyotes (*Canis latrans*). An active kit fox pupping den was observed within the Project mine and process area during the survey (Rado, 1995).

- Federal or State Listed Species:

Desert Tortoise: A single federally listed species, the desert tortoise (*Gopherus agassizii*), was observed throughout the Project ~~mine and process~~ area and along the surveyed ~~access and~~ transmission corridors. A total of 32 observations of live animals, 247 burrows and pallets, 103 scat, 2 nesting sites, and 14 carcasses were observed. For reasons which are not known, most of the individuals and sign were observed in the eastern half of the Project mine and process area (Rado, 1995). Based on site survey information, an estimated total of between 33~~-~~ and 57 animals are present (Rado, 1996).

Gila woodpecker: An adult gila woodpecker (*Melenerpes uropygialis*), a California-listed endangered species, was observed near the southwest corner of the Project mine and process area on January 12, 1995, by a biologist monitoring exploratory drilling. The individual woodpecker was originally perched on a

large ironwood tree in a large wash near the western border of the Project area. Additional searches for this and other gila woodpeckers, including using recorded bird calls in an effort to elicit a response, were negative. This single observation is believed to have consisted of a transient bird (Rado, 1995).

Flat-tailed horned lizard: Records indicate the occurrence of the flat-tailed horned lizard, a federal proposed-for-listing species, in the vicinity of the Project area. This species is associated with fine, sandy-based soils which are absent from the Project area. This species was not documented during site surveys (Rado, 1995). Favorable flat-tailed horned lizard habitat exists near the intersection of Ogilby Road and Interstate Highway 8 (Rado, 1995). Sand sheets, extending east from the Algodones Dunes ~~approximately two miles farther west from the intersection of these highways,~~ provide favorable flat-tailed horned lizard habitat. This sandy-based soil extends north for an approximate distance of one (1) mile from this intersection.

Except as previously discussed, a search of both federal and California threatened and endangered species lists, candidate lists, USFWS special status species lists, BLM sensitive species list and records, the CNDDB database, and other relevant listings and databases did not indicate the presence of any other federal or California listed or proposed wildlife species within the Project area.

- Other Special Status Wildlife Species:

Several ~~currently unlisted~~ wildlife species that are either USFWS Special Status Species, BLM Sensitive Species, and/or designated state Species of Special Concern were recorded during the site surveys. These species include the Chuckwalla (*Sauromalus obesus*), loggerhead shrike (*Lanius ludovicianus*), sharp-shinned hawk (*Falco striatus*), northern harrier (*Circus cyaneus*), and American badger (*Taxidea taxus*). ~~Although suitable colonial roosting sites are not available, one or more sensitive bat species may also forage in the area.~~

Chuckwalla: The surveyed lands were found to contain only marginal chuckwalla habitat. A total of three (3) chuckwallas were observed during surveys of the Project area. All were associated with fractured rocks, where small rock crevices afforded thermal cover and concealment. Although about half of the Project mine and process area is comprised of rocky substrates, larger rock outcrops and associated crevices that constitute optimal chuckwalla habitat are absent from the ~~project~~ Project area (Rado, 1995).

White-throated woodrat: The white-throated woodrat was not documented during surveys of the Project area, which included livetrapping and release for small

mammals (Rado, 1995). ~~Suitable microhabitats dominated by clumps of mesquite and large clumps of beavertail cacti are not present on the Project site (Rado, 1995).~~ The potential for occurrence of this species in the Project area is low (Personal Communication - Nancy Nicolai, BLM, 1996).

~~Desert bighorn sheep: Krausman (1995) evaluated the Project area with respect to bighorn sheep that may range in the vicinity. It was concluded that the Project area and immediate vicinity are not in, or adjacent to, bighorn sheep habitat, and there is no evidence that the Project area is in a corridor between bighorn habitat (Krausman, 1995). This analysis is also supported by biologists who evaluated southeastern Imperial County for bighorn on behalf of the CDFG (Weaver and Mensch, 1968). They concluded that the area encompassing the proposed Project area was not bighorn seasonal or permanent range. No dispersal corridors that would be used to travel between mountain ranges by bighorn were identified (Weaver and Mench, 1968). Bighorn occur in the hills and mountain slopes several miles east of the Project area, including Picacho Peak to the east of the Project mine and process area, and Peter Kane Mountain. A single radio-telemetered ram, originally recorded from the Peter Kane Mountain area, was documented at the extreme southern end of the Cargo Muchacho Mountains, about five miles southeast of the Imperial Project site (Personal Communication - Rusty McBride, CDFG). The specific route this ram travelled to arrive in the Cargo Muchacho Mountains is not known. There is some speculation that the bighorn would likely have travelled along the ridge extending through Indian Pass from Black Mountain toward Picacho Peak (Personal Communication - Nancy Andrew, CDFG).~~

Yuma Puma: The Yuma puma, if present in this area, would use the site for hunting deer, a principal prey species. No natural rock shelters or man-made caves or adits that could be used by mountain lions for refuge or concealment are present within the Project area. The biological survey completed by Rado (1995) concluded that the Project area contains a potential prey base population of deer for mountain lions. However, no mountain lion observations, nor any sign of mountain lions (e.g., tracks), were recorded during the biological surveys of the Project area (Rado, 1995).

American badger: American badgers utilize the Imperial Project area for hunting. A single live badger was observed in a large wash approximately one (1) mile north of the project site in September 1994. Additional badger-excavated rodent burrows were observed in the northern portion of the Project area during transect surveys. The entire Imperial Project site is probably used by low numbers of badgers for foraging (Rado, 1995).

Loggerhead shrike: Loggerhead shrikes were frequently observed during transect surveys. —Observations included two family groups, strongly indicating that both foraging and nesting occurs within the Project mine and process area (Rado 1995).

Crissal thrasher: A single crissal thrasher was observed during surveys of the Project area. The species is closely associated with drainages and wash "edge" vegetation. Based on the presence of wash channels in the area, the species may both forage and breed within the Project area (Rado, 1996).

Vaux's swift: Vaux's swift was observed flying over the Project area during the spring bird surveys. The species would be expected to utilize the general area, including the Project area, during spring and fall migration, but the species does not nest in this region (Rado, 1996).

Arizona Bell's vireo: No Arizona Bell's vireo were observed within the Project area during the biological surveys. Based on the complete absence of habitat for this species, it would not be expected to be encountered within the Project area (Rado, 1996).

Black-tailed gnatcatcher: Black-tailed gnatcatchers were often observed during surveys of the Project area. The species was most frequently observed in secondary drainages, typically less than twenty (20) feet in width, where young ironwood and palo verde trees provide cover (Rado, 1995). This species most likely breeds in the Project area (Personal Communication - Nancy Nicolai, BLM, 1996).

LeConte's thrasher: No LeConte's thrashers were observed during surveys of the Project area. Surveys for this species were intensive, and included the use of tape-recorded calls to elicit responses from birds during the breeding season (Rado, 1995).

- Raptors:

  Non-resident raptors and other bird species are expected to seasonally forage in, or migrate through, the Project area. Migrants and other non-resident species would more likely utilize the area as winter range than during other seasons. No raptor nests have been observed within the Project area or within adjacent areas (Rado, 1995). Raptors observed consist of low numbers of individual birds that utilize the Project area for foraging.

Northern harrier: A total of two (2) northern harrier observations were made during the surveys. Both observations occurred in September and consisted of a single animal foraging over the western portion of the Project area. Based on these findings, the northern harrier appears to seasonally utilize the Project area for foraging (Rado, 1995).

Sharp-shinned hawk: A single sharp-shinned hawk was observed in the northwestern portion of the Project area during September. This single bird was observed foraging in the largest ephemeral stream channel system along the western edge of the Project mine and process area. No additional observations were made. Based on this single observation, the species appears to infrequently forage in the larger ephemeral stream channels which transect the Project area (Rado, 1995). The sharp-shinned hawk probably occurs throughout the area as a seasonal winter migrant. Low numbers of birds may utilize the general area, including the Imperial Project site, for foraging during winter months.

Peregrine falcon: Surveys of the Project area did not document the occurrence of the American peregrine falcon (Rado, 1995 and 1996). The species has also not been recorded during prior inventories of this area (BLM records; DeDycker and Associates, 1994; Condor Minerals Management, 1991). The steeply walled canyons and cliffs favored by this species for nesting are absent from the Project area and surrounding area. Additionally, the Project area is not proximate to wetland habitats also favored by peregrine falcons for foraging.

Golden eagle: Surveys of the Project area did not document the occurrence of any golden eagles (Rado, 1995). The golden eagle could infrequently utilize the general area, including the ~~Imperial~~ Project area, for foraging during winter months.

Ferruginous hawk: No ferruginous hawks were observed during surveys of the Project area (Rado, 1995). The ferruginous hawk could infrequently utilize the general area, including the Project area, for foraging during winter months.

Burrowing owl: No burrowing owls ~~have been~~ were observed during surveys of the Project area (Rado, 1995). The burrowing owl may utilize the general area, including the Project area, for foraging.

Cooper's hawk: No Cooper's hawks were observed during surveys of the Project area (Rado, 1995). However, low numbers of birds may utilize the general area, including the Project area, for foraging during winter months.

Long-eared owl: No long-eared owls were recorded during surveys of the Project area (Rado, 1995). Potential nesting habitat occurs in the Project area (Personal Communication - Nancy Nicolai, BLM, 1996). The long-eared owl may ~~utilize~~ occur in the general area, including the Project area, for foraging.

Prairie falcon: No prairie falcons were observed during site biological surveys (Rado, 1995). Prairie falcons may utilize the general area, including the Project area, for foraging. There are no potential nesting sites for prairie falcons within the Project mine and process area.

Barn owl: No barn owls were observed during site biological surveys, but no owl surveys were conducted. ~~However, they~~ Barn owls may utilize the general area, including the Project area, for foraging (Rado, 1995).

- Bat Species:

No sensitive bat species ~~were recorded during the biological surveys, nor have sensitive bat species~~ have been previously documented within the Project area. ~~In addition, conditions~~ Conditions generally suitable for breeding and roosting were not observed within the Project area. However, individual colonial bats may roost in the palo verde or ironwood trees within the Project area, or may utilize the few small rock crevices found within the Project area. Although suitable colonial roosting sites are not available, one or more sensitive bat species may also forage in the area. Several sensitive species of bats are known to inhabit areas of the Cargo Muchacho Mountains, approximately six (6) miles southeast of the Project area. Surveys of the American Girl Mining Project site (BLM, 1994b) have documented the occurrence of the California leaf-nosed bat (*Macrotus californicus*), Townsend's big-eared bat (*Plecotus townsendii*), and Western mastiff bat (*Eumops perotis*). Two other sensitive bat species, the Spotted bat (*Euderma maculatum*) and the Cave myotis (*Myotis velifer*), may also have been heard during these surveys of the American Girl Mining Project site. Each of these species may utilize the ~~Imperial~~ Project area for foraging (Brown, 1995).

A focused assessment of the -Project area with respect to bat habitat and occurrences was conducted contemporaneous with the biological survey by a third-party consulting biologist (Brown, 1995). This assessment, which is provided as Appendix H, concludes that, as no mine adits, caves, or large rock crevices exist in the Project area, the sensitive bat species, including the Townsend's big-eared bat, western mastiff bat, and spotted bat, would not day-roost in the Project area, but they could forage in the Project area at night.

Desert washes are the prime type of foraging habitat of the California leaf-nosed bat. Leaf-nosed bat populations have been documented in the Cargo Muchacho and eastern Chocolate Mountains. The leaf-nosed bat usually forage within five (5) miles of their roosts in warm months. During summer months they may roost at night between foraging flights in trees in the washes, but in colder months they return to mines for night roosting. As no mines exist in the Project area, the leaf-nosed bat would not roost in the area during the day, but could roost in the trees in the Project area at night between foraging bouts. The nearest known diurnal roost to the Project area is a mine adit approximately 4.5 miles south in the Cargo Muchacho Mountains. However, since the distance of the nearest diurnal roost to the Project area approaches the foraging range of the bat, Brown (1995) concluded that, unless a leaf-nosed bat diurnal roost is discovered closer to the Project area, the Project area is probably not regularly visited by the leaf-nosed bat. Other bats, including most *Myotis* species and bats of the *Tadarida* and *Eumops* genera, forage farther from their roosting areas than the leaf-nosed bat~~,~~ and, thus, may forage in the Project area.

The USFWS Special Status or California Species of Concern (CSC) bats which could possibly roost on, or forage over, the Project area are identified in Table 3-9~~:~~.

Table 3-9: USFWS Special Status Species and California Species of Concern Bat Species Which Could Roost On, or Forage Over, the Imperial Project Area

Common Name	Scientific Name	Status	Roost	Forage
Yuma myotis	*Myotis yumanensis*	USFWS	Low	Medium
Small-footed myotis	*Myotis ciliolabrum*	USFWS	Medium	Medium
Cave myotis	*Myotis velifer*	USFWS/CSC	Low	Medium
Occult-~~myotis~~ little brown bat	*Myotis lucifugus occultus*	USFWS/CSC	Low	Medium
~~Pallid~~ Desert pallid bat	*Antrozous pallidus*	CSC	Medium	Medium
Townsend's big-eared bat	*Plecotus townsendii*	USFWS/CSC	None	Low
Spotted bat	*Euderma maculatum*	USFWS/CSC	None	Low
Western mastiff	*Eumops perotis*	USFWS/CSC	None	High
California leaf-nosed bat	*Macrotus californicus*	USFWS/CSC	None	Low

Source: Brown, 1995

- Game Species:

  Several species of game birds are present within the Project area, including Gambel's quail, mourning dove (*Zenaida macroura*) and white-winged dove (*Zenaida asiatica*), which were observed in the moderate-to-larger ephemeral stream channels (Rado, 1995). These hunted species are common residents or migrants in the area (see Section 3.9.2.3).

  Mule deer: Mule deer are widely distributed throughout the Project area and surrounding vicinity. Based upon a survey of the ephemeral stream channel system, it was found that the channels are regularly used by deer, with principal movements occurring at night (Rado, 1995). Deer sign (i.e., tracks and/or scat) were observed in all major channels within the Project mine and process area, and those extending one (1) or more miles from the Project mine and process area boundaries. The microphyll woodlands typical of these channels apparently serve as movement corridors for the deer. However, fresh deer tracks and scat were also regularly observed on the interspersed desert pavement, showing that deer are dispersed and move freely about cross-country between drainages. No permanent water sources are present within the boundaries of the Project mine and process area which would serve to concentrate deer; however, a CDFG-managed "guzzler" constructed to provide a water source for deer is located off of Hyduke Road, approximately two (2) miles south-southwest of the Project mine and process area. This water source is believed to contribute to the observed east-west movement of deer through the Project area, at approximate right angles to the washes. Subsequent to the biological field surveys, two (2) new "guzzlers" were reported to have been constructed by the CDFG approximately 0.8 miles and 1.5 miles, respectively, from the eastern boundary of the Project mine and process area in September 1995 (Personal Communication - Ted Rado, 1995). Approximate locations of the "guzzlers" with respect to the Project mine and process area are shown on Figure 3-12.

  A focused evaluation of the Project area with respect to deer was conducted contemporaneous with the biological survey by a third-party consulting biologist (Krausman, 1995). This evaluation, which is provided as Appendix I, included reviewing reports of previous deer investigations in the area, reviewing potentially applicable deer herd management plans, communicating with other consulting biologists and agency biologists, and an inspection of the Project area in July 1995. The evaluation concludes that there is some ambiguity as to whether or not the desert deer in the Project area are a subspecies of deer called the "burro" deer (*Odocoileus hemionus eremicus*), which some have reported to differ from desert mule deer (*Odocoileus hemionus crooki*) based on physical differences in the deer. However, more recent investigations suggests there may be no difference in the

mitochondrial DNA haplotype of the "burro" deer to distinguish it from other mule deer populations. Whether the deer in the area are "burro" deer or desert mule deer, their ecology is reported to be similar and habitat components include washes (ephemeral stream channels) with dense vegetation, rolling to steep topography, and water availability. Fawning typically occurs in low, broken hills with vegetated washes near water (Celentano and Garcia, 1984).

The Krausman evaluation reports that in late summer the deer move away from the Colorado River to the desert mountains, and in the late spring they return to the river. Migration routes follow major desert wash systems, and the ephemeral stream channels in the Project area are used by deer as evidenced by tracks and pellets. However, steep topography does not exist within the boundaries of the Project mine and process area, nor does a water source. Krausman states that the literature indicates "... the area in and around the Imperial Project is used by deer moving across the desert flats from mountain foothills to water sources or other important habitat components." -Krausman noted that by comparison, in the Belmont Mountains of Arizona, mule deer were more probably limited by forage availability than by any other factor, including water availability, and that the Belmont Mountain forage area provided more vegetation than the desert flats provide around the Project area. Based on these observations, Krausman concluded that the ~~Imperial~~ Project area is not consistent with habitat used to support a resident deer herd or as important deer fawning habitat. These findings appear to conflict with unpublished information provided by the CDFG indicating that the microphyll woodland in the major washes within the Project area and vicinity provide deer fawning habitat and support numbers of deer (Personal Communication - Rusty McBride, CDFG, 1995).

The CDFG has prepared a deer herd management plan for the deer population inhabiting southeastern San Bernardino, Riverside, and Imperial Counties (Celentano and Garcia, 1984). Deer densities within the general area were reported to average approximately 0.2 animals per square mile (Celentano and Garcia, 1984 after McLean, 1940). However, because of low density and scattered distribution, an accurate estimation of the desert deer herd population is difficult. CDFG records of hunter success in the area have trended upwards since the 1940's, suggesting the deer herd density in the area may be increasing (see Section 3.9.2.3). Deer move seasonally in order to take advantage of water supplies and forage. Principal use of areas removed from the Colorado River takes place during the fall and winter. Fawning typically occurs in the late summer or early fall, within habitats characterized by broken hills and interconnecting washes within one (1) mile of a dependable water source (Celentano and Garcia, 1984). The CDFG is especially concerned about the

cumulative loss of microphyll woodland habitat utilized by deer and other species (Personal Communication - Nancy Andrew, CDFG, 1996).

Desert bighorn sheep: Krausman (1995) evaluated the Project area with respect to bighorn sheep that may range in the vicinity. It was concluded that the Project area and immediate vicinity are not in, or adjacent to, bighorn sheep habitat, and there is no evidence that the Project area is in a corridor between bighorn habitat (Krausman, 1995). This analysis is also supported by biologists who evaluated southeastern Imperial County for bighorn sheep on behalf of the CDFG (Weaver and Mensch, 1968). They concluded that the area encompassing the proposed Project area was not bighorn seasonal or permanent range. No dispersal corridors that would be used to travel between mountain ranges by bighorn were identified (Weaver and Mench, 1968). Bighorn sheep occur in the hills and mountain slopes several miles east of the Project area, including Picacho Peak to the east of the Project mine and process area, and Peter Kane Mountain. A single radio-telemetered ram, originally recorded from the Peter Kane Mountain area, was subsequently documented at the extreme northern end of the Cargo Muchacho Mountains, about five (5) miles southeast of the Project mine and process area (Personal Communication - Rusty McBride, CDFG, 1995). The specific route this ram travelled to arrive in the Cargo Muchacho Mountains is not known. There is some speculation that the bighorn would likely have travelled along the ridge extending through Indian Pass from Black Mountain toward Picacho Peak (Personal Communication - Nancy Andrew, CDFG, 1996).

3.6. Cultural and Paleontological Resources

3.6.1. Regulatory Framework

Historic properties or cultural resources are places or objects that are important for scientific, historic, or religious reasons to cultures, communities, groups, or individuals. 36 CFR Part 800 defines historic properties as "any prehistoric or historic district, site, building, structure, or object included in the National Register [of Historic Places]." Section 106 of the National Historic Preservation Act (Public Law 89-665; 80 Stat 915; U.S.C. 470, as amended) requires a federal agency with jurisdiction over a project to take into account the effect of the project on properties included in or eligible for the National Register of Historic Places (NRHP), and to afford the Advisory Council on Historic Preservation a reasonable opportunity to comment.

3.6.2. Cultural Resources

The following discussions of the cultural history (ethnohistory) of the Project area and the cultural resources identified within the surveyed Project area are briefly summarized from the July, 1996 and September, 1996 cultural resources inventory reports prepared for the Project survey area (ASM Affiliates, Inc., 1996a; ASM Affiliates, Inc., 1996b). More complete discussions of these topics can be found in the non-confidential portions of ~~this~~ these reports, which ~~is~~ are reproduced in Appendix J of this EIS/EIR.

3.6.2.1. Cultural History

Six (6) cultural periods, each with distinctive cultural patterns, may be defined for the Colorado Desert, extending back in time to a period of at least 12,000 years before present (BP). These periods are: (1) Early Man (Malpais) Pattern - 50,000 to 12,000 years BP; (2) PaleoIndian Period (San Dieguito) - 12,000 to 7,000 years BP; (3) Archaic Period (Pinto and Amargosa) - 7,000 to 1,000 years BP; (4) Late Prehistoric Period (Patayan) - 1,500 to 450 years BP; (5) Ethnohistoric Yuman - 450 years BP to present; and (6) Historic Euro-American - 450 years BP to present.

Of the prehistoric cultural materials identified within the Project area, most are likely to belong to the PaleoIndian, Late Prehistoric, or Ethnohistoric Yuman Periods. Some resources from the Historic Euro-American time period were also discovered (~~See~~ see Section 3.6.2.3).

The area in and around the Project was heavily used by pre-contact Native Americans as a travel route and as a source for tool-grade lithics. There are no large habitation sites in the immediate area; however, the Project is proximate to both Indian Pass and Indian Pass Wash, which were natural travel corridors through which substantial foot traffic traveled from the area of the Colorado River to the inland desert areas. Indian Pass ACEC, located about three-quarters (3/4) of a mile north of the Project mine and process area (see Figure 3-12), was specifically designated to protect cultural resources in the form of prehistoric artifacts located in Indian Pass and the adjacent Chocolate Mountains. Because the natural desert pavement of the Project area contains a wide variety of rocks of generally cobble size, which vary in quality for the making of lithic tools from poor to good, the Project area was also subject to substantial "prospecting" for quality lithic materials by the Native Americans who were otherwise traveling through the area. This is evidenced by the numerous "chipping stations" located in the Project area, where potential source materials for lithic tools were tested and, if found promising, were crudely shaped on site then carried away for later

finishing off site. Some wide-ranging foraging activities are also evidenced from the cleared circles and rock rings that may represent short-term encampment.

3.6.2.2. Native American Values

The American Indian Religious Freedom Act (AIRFA) and the Executive Order of April 24, 1995 require~~s~~ that local Native American groups be consulted regarding any proposed projects which may affect traditional religious practices. The BLM has issued internal guidelines which instruct that this consultation should be initiated early in the project review or decision-making process, and be conducted at the highest levels within the BLM jurisdiction responsible for the decision. BLM has initiated this consultation process with the Quechan Tribe ~~Nation~~ regarding the Project, and Quechan Tribe ~~Nation~~ has requested that members be involved in study and development of the treatment plan for the Project. The consultation process is ongoing as of the publication date of this EIS/EIR.

In addition to this consultation process, a third-party ethnographic study based upon consultation with the Quechan Tribe has recently been initiated to assist the BLM, in part, with the identification of contemporary Native American concerns and values associated with the Project area; document current Native American knowledge about the function and/or interpretation of available resources; and record the meaning and significance of resources to Native Americans today. The study also seeks to identify mitigation measures that Native Americans believe would be appropriate to minimize Project-related impacts to sensitive cultural resources, and assist the BLM in its significance evaluation of sites and their eligibility for the NRHP (see also Section 4.1.6.1).

3.6.2.3. Survey Results

An intensive Class III pedestrian survey and cultural resources inventory of the survey area (the Project area and additional buffer areas~~, but not including that portion of Indian Pass Road at its junction with Ogilby Road or the route of the existing 34.5 kV transmission line which is to be overbuilt with the 92 kV transmission line~~) was conducted by ASM Affiliates, Inc. (ASM Affiliates, Inc., 1996a) (see also Appendix J-1). A total of 2,212 acres were included in the area surveyed: 1,648 acres occupying the mine and process area and ancillary area (less the 335 acres which had been previously surveyed at the same level), as well as an additional 564 acres of buffer area adjacent to these areas. This intensive survey was conducted to inventory the cultural resources within the survey area and to evaluate these resources for NRHP eligibility.

The cultural resources identified within the survey area are limited to prehistoric and historic archaeological properties, including isolated resources. Altogether, 49 sites were recorded. Many of the sites included several features. Prehistoric features consist of a total of 194 prehistoric chipping stations; ten (10) trail segments associated with two (2) trail shrines and four (4) pot drops (totaling 35 pot ~~shards~~ sherds); eleven (11) cleared circles; three (3) rock rings; three (3) geoglyphs; and one (1) possible milling slick were recorded within the survey area. Documented historic features were the probable historic use of some of the prehistoric trail segments and four (4) separately defined sites consisting of historic rock features and trash scatters from a World War II-period encampment associated with the Desert Training Center/California-Arizona Maneuver Area.

Preliminary evaluations of these resources by the field investigators for significance under certain criteria for eligibility for the NRHP (see Section 4.1.6.1) ~~is~~ are also presented in Appendix J-1. The field investigators have determined that the prehistoric trail segments and associated features, all of the geoglyphs, all of the ceramic scatters, the chipping stations~~,~~ (when taken together as a whole), and one (1) rock ring site are likely significant resources potentially eligible for the NRHP. The cleared circles, other rock ring sites, and possible milling element were judged likely not significant and not eligible for the NRHP. The probable historic use of historic trails in the area was also judged significant and the trails eligible for the NRHP. The World War II bivouac sites in the region were judged to not be eligible for the NRHP, consistent with previous determinations by the BLM.

A records search and intensive Class III pedestrian cultural resources survey and inventory was also conducted of that portion of Indian Pass Road from its junction with Ogilby Road to the intersection with the existing IID 34.5 kV transmission line, and the entire route of the IID 34.5 kV transmission line which is to be overbuilt with the 92 kV transmission line, including buffer zones (ASM Affiliates, Inc., 1996b) (see also Appendix J-2). A total of approximately seventeen (17) linear miles were surveyed, some of which had been previously included in other cultural resource surveys.

The cultural resources identified by the records search and survey within the survey area included sixteen (16) sites and two (2) isolates. Four (4) of the previously recorded sites could not be relocated due to either subsequent disturbance or insufficient location data recorded on site records. The inventory included four (4) geoglyph sites with associated trails and artifact scatters, seven (7) prehistoric and historic trail segments, one (1) lithic scatter, one (1) ceramic scatter, one (1) historic mining site, and two (2) recent historic rock alignments. Two (2) isolated chert flakes were also recorded.

Preliminary evaluations of these resources for significance under criteria for eligibility for the NRHP (see Section 4.1.6.1) are also presented in Appendix J-2. The field investigators have determined that the four (4) geoglyphs, two (2) of the trails, and the historic mining site are likely significant resources potentially eligible for the NRHP. One (1) trail and one (1) ceramic scatter that could not be relocated were evaluated as indeterminate. The remaining seven (7) sites and two (2) isolates were judged likely not significant and not eligible for the NRHP.

Additional preliminary determinations for NRHP-eligibility will require completion of the ethnographic study and the ongoing consultation between the BLM and the Quechan Tribe (see Section 3.6.2.2). Actual eligibility for the NRHP will be determined by consultation between the California State Historic Preservation Officer (SHPO) and the BLM based on the eligibility criteria discussed in Section 4.1.6.1.

3.6.3. Paleontological Resources

No paleontological resources have been identified within the Project area, and none are expected to be found. This is primarily because the metamorphic and igneous origin of the basement rock units found on the site essentially preclude paleontological resources in these units. Similarly, the cemented alluvial material overlying the site is too young to contain significant paleontological resources, and was deposited in such a high energy environment that it would not be expected to contain such resources.

3.7. Visual Resources

3.7.1. Regulatory Framework

Scenic quality is a measure of the visual appeal of a parcel of land. Section 102(a)(8) of the Federal Land Policy and Management Act of 1976 (FLPMA) placed an emphasis on the protection on the quality of scenic resources on public lands. Section 101(b) of the National Environmental Policy Act (NEPA) of 1969 required that measures be taken to ensure that aesthetically pleasing surroundings be retained for all Americans.

To ensure that these objectives are met, the BLM devised the Visual Resource Management (VRM) System. The VRM System provides a means to identify visual values; establish objectives for managing these values; and provide information to evaluate the visual effects of proposed projects. The inventory of visual values combines evaluations of scenic quality, sensitivity levels, and distance zones to establish visual resource inventory classes, which are "informational in nature and

provide the basis for considering visual values in the [land use planning process]. They do not establish management direction and should not be used as a basis for constraining or limiting surface disturbing activities." (U.S. Bureau of Land Management, 1986b).

Visual resource management classes are assigned to public land units through the use of the visual resource inventory classes in the BLM's land use planning process. One (1) of four (4) visual resource management classes is assigned to each unit of public lands. The specific objectives of each of the visual resource management classes are presented in Table 3-10.

Table 3-10: BLM Visual Resource Management Classes

Class	Description
I	The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.
II	The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant nature features of the characteristic landscape.
III	The objective of this class is to partially retain the existing character of the landscape. The level of change to the character should be moderate. Management activities may attract attention, but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.
IV	The objective of this class is to provide for management activities which require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. Management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic element.

Source: US BLM, 1986b

The Project area is located within the California Desert Conservation Area (CDCA), which was created by FLPMA in recognition of the unique management requirements of the California Desert (see Section 3.9.1). The BLM's CDCA Plan has assigned one (1) of four (4) multiple use class designations to each unit of BLM-administered public lands within the CDCA. In the CDCA, visual resource management objectives are based upon the guidelines associated with each of the

multiple use classes. The Project area has been designated as Class L - Limited Use, which is equivalent to CDCA visual resource management Class II.

3.7.2. Existing Visual Resources

The Project area landscape consists of a series of gently rolling ridgelines and upland areas interspersed with a series of slightly incised subparallel ephemeral drainage channels which all gently slope from north-northeast to south-southwest at approximately one (1) percent. The Project area is relatively undisturbed, with only a few roads and trails and minor disturbances from historic and ongoing mineral exploration activities. The upland areas support a sparse creosote bush scrub plant community, dominated by creosote bush (*Larrea tridentata*), ocotillo (*Fouquieria splendens*), and small numbers of desert shrubs and forbs. The ephemeral stream channels and the areas adjacent are dominated by a sparse community of desert ironwood (*Olneya tesota*), palo verde (*Cercidium floridum*), cat claw (*Acacia greggii*), burrowbush (*Ambrosia dumosa*), brittle-bush (*Encelia farinosa*), also with a few other desert shrubs and forbs. Much of the upland areas are covered by well-developed desert pavement of gravel- to cobble-size rocks.

The landscape color consists principally of browns, tans, and grays, while vegetation colors are generally browns, greens, yellows, and tans. Because of the sparse vegetation cover, the existing landscape colors meld with vegetation colors from distant points.

The visual resources of the Project area were evaluated using the methods outlined in Section 8431 - Visual Resource Contrast Rating of the BLM VRM Manual (U.S. Bureau of Land Management, 1986a). The contrast rating system is a planning and design guide which is used to assess the degree to which a proposed project contrasts with the existing visual character of the project area. It is used to identify visual impacts of proposed management activities and to identify mitigation measures which can be taken to reduce the identified visual impacts resulting from discordant project features (U.S. Bureau of Land Management, 1986a).

Contrast ratings for the Project area were determined from three (3) viewing locations, known as Key Observation Points (KOPs), which were selected as representative of the possible views of the Project area. The selected KOPs were: from Ogilby Road, at the 45 degree turn to the northwest located approximately five (5) miles southwest of the Project mine and process area (KOP #1); from a point near the electronic stations atop Black Mountain, approximately six (6) miles northwest of the Project mine and process area (KOP #2); and from a hilltop just south of Indian Pass in the Picacho Wilderness Area, approximately two (2) miles northeast of the Project mine and process area (KOP #3) (see Figure 3-14). The

Figure 3-14: Location of Key Observation Points for Visual Evaluations

visual contrast rating for each of the KOPs was completed using the Visual Contrast Rating Worksheet (Bureau Form 8400-4). The completed worksheets are attached as Appendix K.

Portions of the Project mine and process area are potentially visible from a short section of Ogilby Road, at the point where the road turns to the northwest approximately five (5) miles southwest of the Project mine and process area (KOP #1). Views of the Project mine and process area from other portions of Ogilby Road are blocked, either by slightly elevated topography or by dense vegetation located adjacent to the road. Persons viewing the Project mine and process area from this point, KOP #1, would currently view a landscape which has flat form and an undulating line in the middleground and a rhomboid form and angular to jagged line in the background (see Figure 4-1). The middleground texture is smooth with a tan to gray color. The background texture is smooth to rough with a brown to tan color.

The entire Project area is visible from elevated vantage points on Black Mountain, approximately six (6) miles to the northwest of the Project mine and process area. Persons viewing the Project mine and process area from the southern end of the top of Black Mountain (KOP #2) would currently see a landscape which has a flat, smooth to simple form and a flowing to weak line in the middleground, and a steep, smooth to simple form and geometric to soft line in the nearground (see Figure 4-3). The middleground texture is stripped to directional with a gray to brown color. The nearground texture is granular to patchy with a black to brown color.

The entire Project area is also visible from the most elevated vantage points within the recently created Picacho Wilderness Area, including the hilltop immediately south of Indian Pass and Indian Pass Road, approximately two (2) miles northeast of the Project mine and process area. Persons viewing the Project mine and process area from this point (KOP #3) would view a landscape which has a flat, smooth to minor rolling form and an undulating to irregular line (see Figure 4-5). The texture is granular, sparse to patchy with a tan, brown to black color.

3.8. Noise

3.8.1. Regulatory Framework

The Noise Element of the Imperial County General Plan provides a program for incorporating noise issues into the land use and planning process, with a goal of minimizing adverse noise impacts to sensitive noise receptors. The Noise Element establishes goals, objectives and procedures to protect the public from noise intrusion. The Noise Element for Imperial County is applicable to lands owned or zoned by the county. Lands regulated by the state or federal government, such as those

~~**Figure 3-15**: Current View of the Project Mine and Process Area from Ogilby Road (KOP #1)~~

~~**Figure 3-16**~~: ~~Current View of the Project Mine and Process Area from Black Mountain (KOP #2)~~

~~Figure 3-17: Current View of the Project Mine and Process Area from a Hilltop Near Indian Pass in the Picacho Wilderness (KOP #3)~~

incorporated by the Proposed Action, however, are preempted from local land use policy (County of Imperial, 1993e).

Noise is a form of energy that is generally described as unwanted sound. Noise levels, or sound pressure levels, are typically measured in units of A-weighted decibels [dB(A)] using a logarithmic scale which "frequency-weights" sounds within the audible range to approximate human hearing. Human hearing typically encompasses the sound range from approximately 5 dB(A) at the quietest end to approximately 140 dB(A), where pain is produced in most listeners.

3.8.2. Existing Noise Levels

Ambient noise level measurements for the Project area are not available. However, ambient noise levels in the Project area and vicinity are assumed low and typical of isolated desert areas (i.e., 35 to 50 dBA), except as may be modified by those noise generating activities in the Project area and vicinity, including:

- Traffic traversing Indian Pass Road through the Project area;
- Infrequent and intermittent military aircraft maneuvers and military weapons explosions associated with the use of the Chocolate Mountain Aerial Gunnery Range (CMAGR), located to the northwest of the Project area;
- Infrequent military aircraft overflights associated with Visual Flight -Rule (VFR) corridors located above and adjacent to the Project area;
- Military helicopter use of the Project area as a training ground for the use of night vision -devices;
- Noise associated with dispersed recreational activities, including: OHV, hunting, and camping uses of the Project area and vicinity;
- Mineral exploration, including drilling by Chemgold under existing BLM approvals; and
- Natural sources, such as wind, rain, thunder, and wildlife.

Sensitive noise receptors are, in general, those areas of human habitation or substantial use where the intrusion of noise has the potential to adversely impact the occupancy, use, or enjoyment of the environment. These can include residences, schools, hospitals, parks, and places of business requiring low levels of noise. Since the Project area is situated in a very remote area, there are no such typical sensitive

human receptors in or anywhere near the Project area. However, sensitive noise receptors may also be defined to include potentially noise-sensitive wildlife, which may currently be present in or near the Project area (see Section 3.5.6). The boundaries of two (2) wilderness areas are also located within one and one-half (1½) miles of the Project mine and process area (see Figure 3-12 and Section 3.9.2.1).

3.9. Land Use

3.9.1. Regulatory Framework

Plans and policies applicable to the Project area include:

- The Imperial County General Plan
- Imperial County Zoning Regulations
- BLM California Desert Conservation Area (CDCA) Plan

The state-mandated Imperial County General Plan (General Plan) was developed to create a balanced, comprehensive guide for future physical growth of lands within the County, and provides mechanisms to achieve the County's desired goals and objectives (-County of Imperial, 1993e). The General Plan strives towards achieving a balance between development and economic, social, and environmental resources. The General Plan consists of nine (9) elements: Land Use, Housing, Circulation and Scenic Highways, Noise, Seismic and Public Safety, Agriculture, Conservation and Open Space, Geothermal and Transmission Resources, and Water Resources (-County of Imperial, 1993e).

A Land Use Map is provided as part of the Land Use Element of the General Plan which depicts projected land use development patterns within Imperial County. The Land Use Plan indicates that the Project area is located within a large expanse of land currently dedicated to open space/recreation uses.

The Conservation and Open Space Element of the Plan is concerned with mineral resources, open space and other environmental resources. The purpose of the Conservation and Open Space Element of the General Plan is to:

- Promote the protection, maintenance, and County's natural resources with particular emphasis on scarce resources and resources that require special control and management;

- Prevent the wasteful exploitation, destruction, and neglect of the State's natural resources;

- Recognize that natural resources must be maintained for their ecological value as well as for the direct benefit to the public; and

- Protect open space for the preservation of natural resources, the managed production of resources, outdoor recreation, and public health and safety.

Imperial County zoning and other land use regulations are designed to promote land use compatibility by designating acceptable uses and activities within identified areas or zones. Zoning regulations promote or prohibit uses, and designate appropriate building classes or structures within the various zones which are, in part, intended to prevent or inhibit conflicting or incompatible growth or uses within the respective zones. The Project area is currently zoned "S-Open Space."

The Project area is located entirely on public land administered by the BLM. As Imperial County has no direct land use jurisdiction over public lands, neither the General Plan nor the Imperial County zoning regulations are directly applicable to proposed activities on public lands. However, the Imperial County Planning~~-and~~ /Building Department is the CEQA Lead Agency for the Project, and has the ability to adopt and require implementation of reasonable environmental mitigation measures for projects proposed on public lands.

In 1976, Congress enacted the Federal Land Policy and Management Act (FLPMA) and established the 25 million acre California Desert Conservation Area (CDCA). The CDCA Plan is a comprehensive, long range plan for the management, use, development, and protection of the 12 million acres of public land within the boundaries of the CDCA which are administered by the BLM. The CDCA Plan was adopted in 1980, and has been subsequently amended on a periodic basis. The goal of the CDCA Plan is to provide and enhance uses for public lands without diminishing the environmental, cultural, and aesthetic values of these lands (USDI, 1980).

The Project area is located entirely within the CDCA. The majority of the public lands within the CDCA have been designated under a multiple use classification system. Four (4) multiple use classes have been established: Class C (Controlled Use); Class L (Limited Use); Class M (Moderate Use); and Class I (Intensive Use). Specific guidelines have been established for each recognized activity in each multiple use class. The Project area is located entirely in an area designated Class L, or Limited Use. Class L areas are intended to generally protect sensitive, natural, scenic, ecological, and cultural resources, and are typically managed to provide for generally lower-intensive, controlled, multiple use of resources, while ensuring that sensitive resources are not significantly reduced. Mineral exploration and development projects are allowed in Class L areas.

3.9.2. Existing Land Uses

The entire Project area is located within a remote area of eastern Imperial County on undeveloped public lands administered by the BLM. Current land uses in the area consist of mineral exploration and development, aerial military training overflights, and dispersed recreational activities by the general public. Similar public lands with similar uses generally surround the Project area. The nearest residence to the Project mine and process area is Gold Rock Ranch, which is located approximately seven (7) miles southwest of the Project mine and process area. No other permanent residences are known to exist within ten (10) miles of the Project area.

Several operating mines are located in the vicinity of the Project area. The American Girl/Oro Cruz Mine is located about seven (7) miles south of the Project area; the Mesquite Mine is located about ten (10) miles to the northwest of the Project area; and the Picacho Mine is located about eight (8) miles east of the Project area.

The U.S. Marine Corps (USMC) maintains the Chocolate Mountain Aerial Gunnery Range (CMAGR), which at its closest is approximately ten (10) miles northwest of the Project area. The CMAGR is actively used for military aircraft training and live ordnance delivery. The USMC conducts both daytime and nighttime helicopter flight training in and around the Project area, and two (2) military visual flight rule (VFR), low-level flying routes for fixed wing aircraft are located in the vicinity of the Project area (Personal Communication - T. Manfredi, June 2, 1995).

The BLM is currently drafting a long-term regional management plan which will include the Project area. The plan, entitled "Northern and Eastern Colorado Desert Coordinated Management Plan" (NECDEMP), will address a broad spectrum of land uses which include mineral exploration and development as well as protection of biological resources. Plan decisions will involve only state and federal lands and will provide the basis for the BLM to amend its 1980 California Desert Conservation Area Plan (CDCA) and the cooperating agencies to update their land and resource management plans. An overview and progress report on the plan was published in July 1995 and addresses those comments received during the public scoping period. The progress report states that the scoping process has been completed and that a draft plan is anticipated for spring of 1996 (USDI, 1995a).

3.9.2.1. Wilderness Areas

The Wilderness Act of 1964 established the National Wilderness Preservation System which is comprised of public and other federal lands designated by Congress as wilderness. The California Desert Protection Act of 1994 gave wilderness designation to 69 individual areas of public land within the CDCA.

Two (2) Wilderness Study Areas (WSAs) in the vicinity of the Project area, Picacho Peak (CDCA 355A) and Indian Pass (CDCA 355), were designated as wilderness areas (USDI, 1995b) (see Figure 3-12). The Picacho Peak Wilderness Area encompasses a total of approximately 7,700 acres, and is located approximately three-quarters (3/4) of a mile northeast of the Project mine and process area at its nearest point (USDI, 1994). (There is currently some question regarding the correct location of the southern boundary of the Picacho Wilderness Area. The boundary shown on Figure 3-12 is that taken from USDI, 1994. The boundary marked in the field is further south by as much as 1,000 feet.) The Indian Pass Wilderness Area encompasses a total of approximately 33,855 acres within the Chocolate Mountains, and is located approximately one and one-half (1½) miles north of the Project area at its closest point. The southern boundary of the Indian Pass Wilderness Area is generally separated from the northern boundary of the Picacho Peak Wilderness Area by Indian Pass Road, which provides access to both of the wilderness areas from the southwest (USDI, 1994). ~~There is also currently some question~~

3.9.2.2. Areas of Critical Environmental Concern

FLPMA defines Areas of Critical Environmental Concern (ACEC) as ~~those areas~~ an area within public lands where special management attention is required to protect and prevent irreparable damage to important historic, cultural, or scenic values; fish and wildlife resources; other natural systems or processes; or to protect human life and safety from natural hazards (USDI, 1980). ACECs are typically not managed for multiple use, but they do not preclude appropriate development if protection of sensitive values can be assured.

The Project area is not located within any designated ACEC. The nearest ACEC is the Indian Pass ACEC, located about three-quarters (3/4) of a mile north of the Project area (see Figure 3-12). The Indian Pass ACEC was designated to protect cultural resources in the form of prehistoric artifacts located in the Chocolate Mountains approximately four (4) miles southeast of Quartz Peak. The only other ACEC located in the vicinity of the Project area is the ~~Golden Basin-Rand Intaglios~~ Singer Geoglyphs, located about ten (10) miles west-northwest of the Project area. This ACEC was also nominated to protect cultural resources in the form of a number of intaglios located within that area.

3.9.2.3. Recreation Resources

Numerous dispersed recreational opportunities exist in the vicinity of the Project area. These uses include: hunting, camping, hiking, picnicking, rock collecting, photography, off-road vehicle use, and off-highway vehicle use. The

nearest developed recreational facilities include the private Gold Rock Ranch, a small campground facility with a general store located approximately seven (7) miles southwest of the Project mine and process area, and the Picacho State Recreational Area, located about six (6) miles northeast of the Project mine and process area along the Colorado River.

Indian Pass Road serves as the primary access route to the new Indian Pass and Picacho Wilderness Areas. The wilderness areas are likely to attract campers, rock collectors, and sightseers. Indian Pass Road also serves as a secondary route to the Picacho State Recreation Area, located approximately four (4) miles east-northeast of the Project mine and process area, and it forms a loop with Picacho Road circling back south to Interstate 8.

No site-specific records are available with respect to the volume of camping or other dispersed recreational activities which may be undertaken in the immediate vicinity of the Project mine and process area. No improved campsites or facilities exist in the immediate area, but old fire rings and indirect evidence of primitive campsites were observed at a few locations along the wash west of Indian Pass Road between its intersection with Ogilby Road and the Project mine and process area. It is presumed that the heaviest volume of visitors in the area would occur during hunting seasons and in the winter months when temperatures are more moderate and recreational vehicle and "snowbird" visitation generally increases in the region.

The Imperial Sand Dunes Recreation Area (ISDRA) is located approximately ten (10) miles west of the Project area in the Algodones Sand Dunes. The area south of State Route 78 is used for camping and off-highway vehicles (OHV), while the area north of State Route 78 is reserved for more passive recreational uses. The Imperial Sand Dunes Recreation Area is perhaps the most well known landmark in Imperial County and attracts thousands of off-road vehicle (ORV) enthusiasts each year. The dunes extend for more than 40 miles along the eastern edge of the Imperial Valley and average approximately five (5) miles in width.

The D-12 deer hunt zone, which encompasses over 7,000 square miles in the eastern portions of San Bernardino, Riverside and Imperial Counties, including the Project area, has long been recognized by local hunters as providing valued desert deer hunting opportunities (Celentano, R.R. and J.R. Garcia, 1984). In recent years, hunting interest has increased, bringing additional pressures on the local deer population (Davis, J. and B. Schaefer, 1995). The estimated total population of deer in the D-12 zone is 1,700 (CDFG, 1996); however, total deer population in the area is difficult to estimate and data is particularly expensive to obtain due to the low density and scattered distribution of the deer. As such, the

herd size is typically discussed in relative terms based on climatic conditions, plant productivity, herd composition, and harvest data (Celentano and Garcia, 1984). The CDFG recently compared the following methods for collecting deer data in the Sonoran desert: (a) helicopter surveys, (b) ground surveys, and (c) hunter interviews. It was concluded that each of the three (3) methodologies provided generally comparable findings with respect to estimating the frequency of male, female, and juvenile mule deer within the survey area (Thompson and Bleich, 1993). Based, in part, on these findings, the CDFG is currently using hunter surveys to provide demographic information about deer in the D-12 zone. Hunter survey data for the D-12 deer hunt zone has now been collected for two (2) years (i.e., the 1994 and 1995 hunting seasons) (Personal Communication - Nancy Andrew, CDFG, 1996).

~~A total of 34,736 deer were estimated to have been killed by hunters statewide in California in 1995. This estimate includes both the deer take reported by hunters (17,273) and the estimated average statewide nonreporting of 49 percent.~~ The reported deer taken in the D-12 zone in 1995 was 60 deer (CDFG, 1996). ~~An~~ Using the estimated statewide average nonreporting of 49 percent, an additional 60± nonreported deer were probably also taken, for an estimated total of about 120 deer harvested within the D-12 zone. The Project area is located in Area IV of the D-12 zone (an area south of State Route 78 extending to the U.S.-Mexico border, and from the Colorado River west to the Imperial Valley). According to the two (2) recent deer hunter surveys compiled by the CDFG, a total of three (3) bucks were taken by the 26 hunters responding to the survey who hunted in Area IV during the 1994 season (approximately a 12 percent success rate); and a total of twelve (12) bucks were taken by the 29 hunters responding to the survey who hunted in Area IV in 1995 (about a 41 percent success rate). These survey numbers can be compared to the average hunter success rates statewide and the entire D-12 zone, including Area IV, over the past six (6) years (~~See~~ see Table 3-11). The CDFG expects to issue 1,100 deer tags for the 1996 hunt in the D-12 zone.

Table 3-11: Summary of Reported Deer Hunter Success Rates for Years 1990 - 1995

Area	Hunter Success Rates by Percent by Year					
	1990	1991	1992	1993	1994	1995
Statewide	14	12	12	10	11	8
D-12 Deer Hunt Zone	3	6	6	7	6	6

Source: (CDFG, 1996)

It is unclear from the information available if the reported higher relative success rate of hunters in Area IV is a result of an increasing population of deer resulting from consecutive years of favorable conditions (see Section 3.5.5), or other factors such as continuing increased ORV use and hunting pressure, as suggested by Celentano and Garcia (1984) to reflect the increased deer kill trend observed within the D-12 zone over the years 1945 to 1984.

Game birds, including Gambel's quail, mourning dove, and white-winged dove, inhabit the washes in the Project area. Relatively little statistical information is available regarding small game in the area, but it is reported that some hunters from the Imperial Valley favor hunting game birds in the desert washes over hunting these species within the Valley proper (Personal Communication - Carol Sassie, CDFG, 1996).

3.10. Socioeconomics

The Proposed ~~Imperial~~ Project would have an influence on the socioeconomic environment of both Imperial County, California and Yuma County, Arizona. Pertinent socioeconomic data and background data for both Yuma and Imperial Counties is summarized below.

3.10.1. Imperial County, California

Imperial County occupies an area of 4,284 square miles in the southeastern corner of California. It is bounded on the north by Riverside County, on the west by San Diego County, on the south by Mexico, and on the east by the Colorado River and Yuma County, Arizona.

3.10.1.1. Demographics

The Project area lies within a sparsely populated, unincorporated area of Imperial County. According to demographic statistics available from the State of California Department of Finance, Demographic Research Unit, Imperial County had a total population of 135,675 as of January 1, 1994 (California Department of Finance, 1994).

The significant population centers located within California nearest the Project area are the City of Holtville, located approximately 50 road miles to the southwest; the City of Brawley, located approximately 56 road miles to the west-northwest; and the City of El Centro, located approximately 60 road miles to the southwest of the Project mine and process area. The estimated 1994

population for the cities of Holtville, Brawley, and El Centro were 5,576; 21,738; and 36,717; respectively (California Department of Finance, 1994).

3.10.1.2. Housing

According to estimates based upon the 1990 U.S. Census, Imperial County was projected to have 40,366 households by 1994. The estimated number of persons per household in 1994 was projected to be 3.48 (California Department of Finance, 1994).

3.10.1.3. Employment and Income

The labor force for Imperial County in 1994 was estimated by the State of California Economic Development Department to be 48,825. Per capita income in 1990 was estimated at $15,343 for residents of Imperial County. Median family income for 1990 was estimated at $25,147. ~~Families classified as living in poverty in Imperial County during this time constituted 23.8 percent of the 1990 population. This represented the highest poverty rate for any county within the State of California.~~

The local economy of Imperial County is based principally on agriculture, government services, and retail trade. According to 1990 estimates, 35.1 percent of the county's work force was employed in agriculture, 21.3 percent was employed in government services, and 15.2 percent were employed in retail trade. Unemployment rates were estimated at 19.3 percent of the total work force of Imperial County in 1994.

3.10.2. Yuma County, Arizona

Yuma County occupies 5,509 square miles, and is situated in the far southwest corner of Arizona. Yuma County is bounded on the west by the Colorado River and Imperial County, California, on the north by La Paz County, on the east by Maricopa and Pima Counties, and on the south by Mexico. The City of Yuma is the county seat.

3.10.2.1. Demographics

Yuma County was projected to have a population of 120,827 in 1995 (Yuma Economic Development Corporation, 1994). The City of Yuma in Yuma County, Arizona, approximately 30 road miles southeast of the Project area, is the nearest significant population center to the ~~Imperial~~ Project area. The 1993 population of

the City was estimated to be 57,730 (Yuma Economic Development Corporation, 1994).

3.10.2.2. Housing

Yuma County was estimated to have 35,791 occupied housing units in 1990 (Arizona Public Service Company, Economic Development Department, and Azstats, 1994). For the same period, the estimated number of persons per household was 2.9 (Yuma Economic Development Corporation, 1994).

3.10.2.3. Employment and Income

The 1993 work force for Yuma County was estimated to be 45,300. The estimated 1992 per capita income for Yuma County was $12,504, and the 1990 median family income was estimated at $25,648 (Arizona Public Service Company, Economic Development Department, and Azstats, 1994).

Yuma County's leading employers are agriculture, government, and tourism. The largest employers in Yuma County are the U.S. Marine Air Corps Station and Yuma Proving Grounds (Yuma Economic Development Corporation, 1994). The estimated 1992 unemployment rate for Yuma County was 22.8 percent (Arizona Public Service Company, Economic Development Department, and Azstats, 1994).

3.11. Roads~~, Utilities~~ and Public Services

3.11.1. Roads and Transportation System

Although the Project area is located in a relatively remote section of Imperial County, the existing road system provides direct access from the west. The Project mine and process area is located along Indian Pass Road, approximately six (6) miles northeast of the intersection of Indian Pass Road with Ogilby Road. Main access to Indian Pass Road and the Project area is via Ogilby Road, either from the south, approximately thirteen (13) miles from the Ogilby Road exit off Interstate 8, or from the north, approximately eleven (11) miles from the intersection of Ogilby Road with State Route 78 (see Figure 3-14).

Indian Pass Road is an approximately 24-foot-wide, graded gravel road which provides access to Indian Pass and the southern Chocolate Mountains, and the recently created Indian Pass and Picacho Wilderness Areas, for campers, rockhounds, sightseers, and OHVs. Indian Pass Road is maintained by the Imperial County Department of Public Works (ICDPW), Road District No. 5, Holtville, under the

general right-of-way granted by federal Revised Statute 2477 (R.S. 2477) on July 26, 1866, for public highways across public lands which were not otherwise reserved for any use. FLPMA rescinded R.S. 2477 in 1976, but no right-of-way under the FLPMA right-of-way regulations (43 CFR 2800) has been requested by Imperial County or granted by the BLM.

Hyduke Road is an approximately 15-foot-wide dirt road which extends from Ogilby Road to the Colorado River in the east. It provides access to the recently created Picacho Wilderness Area and to the Picacho State Recreation Area Headquarters located along the western shoreline of the Colorado River and is used by campers, rockhounds, sightseers, and OHVs. Hyduke Road is maintained by the ICDPW also under the general right-of-way granted by federal R.S. 2477, without a FLPMA right-of-way.

Both Indian Pass Road and Hyduke Road have been included in the BLM's National Backcountry Byways program. This program is the BLM's contribution to the larger National Scenic Byways program, which is intended to increase the awareness of scenic corridors that are "off the beaten path" (USDI, no date).

Ogilby Road (County Road S-34) is a two-lane, paved county road also maintained by the ICDPW. State Route 78, a paved two-lane state highway, and Interstate Highway 8, a four-lane interstate highway, are both maintained by District 11 of the California Department of Transportation (Caltrans).

Traffic volume counts [average weekday vehicle trip ends (AWVTE)] were taken in 1993 on several roads in the vicinity of the Project area, although no traffic volume counts on Ogilby Road in the vicinity of Indian Pass Road, or on Indian Pass Road itself, were taken. The available counts are given in Table 3-12.

Table 3-12: Traffic Volume Counts on Roads in the Vicinity of the Project Area

Location	AWVTE
Interstate 8 between Gordon's Well Road and Ogilby Road	10,000
Interstate 8 between Pilot Knob Road and Ogilby Road	10,300
Ogilby Road just south of its crossing of the Southern Pacific railroad tracks	928
State Route 78 between Glamis Road and Ogilby Road	1,500
State Route 78 at Palo Verde Ave. in Palo Verde	1,550

Source: Neil Jorgensen, Personal Communication, ICDPW, November 1995

All public lands are classified within one (1) of three (3) vehicle use categories: open, closed, or limited (USDI, Desert Access Guide No. 21, Midway Well). The Project area and surrounding area are designated as Limited Use Areas. Limited Use Areas are those areas which are available for motorized vehicle use subject to certain restrictions. Within Limited Use Areas, routes of travel are further designated as either open, closed, or limited. Vehicle access within Limited Use Areas are restricted to open and limited approved routes of travel. Figure 2-6 shows the routes of travel within the Project area and vicinity and the use designation assigned to each vehicle route (USDI, Desert Access Guide No. 21, Midway Well).

The main line of the Southern Pacific Railroad operates in the vicinity of the Project area, and crosses Ogilby Road at a point approximately nine (9) miles south of the intersection with Indian Pass Road and approximately 3.7 miles north of Interstate Highway 8. The Ogilby Road railroad track crossing is secured with standard crossing gates with flashing lights and warning bells (~~Neil Jorgensen,~~Personal Communication~~,~~ - Neil Jorgensen, ICPWD, November 1995).

3.11.2. Utilities

The Project area lies within the service area of the Imperial Irrigation District (IID), a state-chartered municipal utility which provides electrical energy to nearly all of the residential, commercial, and industrial users within Imperial County and southeastern Riverside County. The IID service line nearest the Project area is a 34.5 kV transmission/distribution line which crosses Indian Pass Road just north of its intersection with Ogilby Road (see Figure 3-12). This transmission line transmits power from the higher voltage IID transmission lines in the south to the electronic equipment located atop Black Mountain. The IID has indicated that this 34.5 kV transmission line has insufficient capacity to supply the electrical requirements of the Project (see Section 2.3.1.4). A Western Area Power Authority (WAPA) 161 kV transmission line runs parallel and adjacent to the IID 34.5 kV transmission line; however, WAPA has determined that it could not provide the Project with "firm," or non-discretionary, capacity to transmit the power from this transmission line.

Because of its strong agricultural base, Imperial County's economy is tied to the availability of inexpensive water. Most agricultural and potable water for use in Imperial County is supplied from the Colorado River by the IID via the All-American Canal. However, due to its remoteness, there is no public water service available to the Project area from the IID or others. Potable and process water for other projects located in the vicinity of the Project area -is typically obtained from private wells.

Sewer district's are located in most of the cities and unincorporated population centers of Imperial County and Yuma, although no sewer district covers the Project

area. Sanitary waste treatment for areas not within a sewer district is typically handled by individual on-site septic tanks and leaching systems in accordance with Imperial County Health Department regulations.

Natural gas is available in many parts of Imperial County and Yuma County; however, there are no gas lines in the vicinity of the Project area, and natural gas service is thus not available. However, propane supplied from individual tanks is readily available from several suppliers in Imperial County and Yuma County.

Telephone service is not currently available to the Project site. The operating mines in the vicinity of the project either have telephone service from Pacific Bell, or operate an on-site microwave telephone system.

As of 1993, there were ten (10) Imperial County-operated Class III disposal sites located throughout Imperial County which were authorized to accept non-hazardous solid waste (County of Imperial, 1993e). Three (3) of these landfills were located on land owned by Imperial County; six (6) were operated by Imperial County on public lands managed by the BLM; and one (1) was located on the ~~Quechan-~~Fort Yuma Indian Reservation ~~reservation~~. In addition to these facilities, one (1) privately operated public Class III waste disposal site was located in an unincorporated area northwest of the City of Imperial; one (1) privately operated public Class I landfill facility authorized to accept specific hazardous wastes was located west of the City of Westmorland; and one (1) private Class II solid waste disposal/storage facility authorized to accept~~ed~~ designated waste was located northwest of the City of Westmorland (County of Imperial, 1993e).

3.11.3. Public Services

Police service for the Project area is provided by the Imperial County Sheriff's Department, which maintains a substation in Winterhaven, California, an unincorporated community located across the Colorado River from the City of Yuma, Arizona, and approximately 28 road miles from the Project mine and process area. Fire service for the Project area is provided by the Winterhaven Fire Department.

The nearest hospital to the Project area is the Yuma Regional Medical Center, located within the City of Yuma, Arizona, a distance of approximately 30 road miles from the Project mine and process area. The El Centro Regional Medical Center is located approximately 60 road miles from the Project mine and process area.

Imperial County's education system consists of eighteen (18) school districts which contain 37 elementary schools, seven (7) high schools, six (6) adult schools, one (1) community college (Imperial Valley College) and one (1) satellite campus of

San Diego State University (County of Imperial, 1993e). Yuma County contains 24 elementary schools, four (4) high schools, four (4) private and parochial schools, and one (1) community college (Arizona Western College). Public school enrollment in Yuma County is approximately 24,250 students. An additional 500 students are enrolled in private and parochial schools (Yuma Economic Development Corporation, 1994).

3.12. Other Resources

The Project area is not in or adjacent to any of the following: (a) an area of prime or unique farmland; (b) a floodplain, as mapped by the Federal Emergency Management Agency (FEMA); or (c) a designated wild, scenic, or recreational river.

4. ENVIRONMENTAL CONSEQUENCES AND MITIGATION MEASURES

4.1. Proposed Action

4.1.1. Geology and Mineral Resources

4.1.1.1. Assumptions and Assessment Guidelines

The Proposed Action would normally have a significant effect on the environment if it would:

- Expose people or structures to major geologic hazards; or
- Substantially restrict the future ability to utilize mineral resources.

4.1.1.2. Impacts of the Proposed Action

Seismicity:

Seismic review of regional faults (active and potentially active) has indicated maximum credible earthquake magnitudes of 5.8 to 7.5 (see Table 4-1). However, because of the distance from each of these faults to the Project mine and process area; the nature of the underlying geologic units; and the depth to ground water; regional seismicity is not expected to cause significant horizontal accelerations or extensive ground shaking within the Project area.

Table 4-1: Summary of Maximum Probable Seismic Events and Effects

Fault or Fault Zone	Distance and Direction from Project Area (miles/direction)	Maximum Probable Magnitude	Effects at Project Area	
			Maximum Probable Peak Acceleration (g)[a]	Duration of Strong Ground Shaking (seconds)
East Mesa	29/West	6.0	0.17	18
East Highline Canal Lineament	32/West	6.0	0.09	18
Imperial/Brawley	42/Southwest	6.8	0.07	24
Brawley Seismic Zone	44/West	5.8	0.04	18
Superstition Hills	55/West	7.0	0.05	30
San Andreas	63/Northwest	7.5	0.04	36
Elsinore	77/Southwest	7.0	0.03	30

[a]Source: Joyner and Fumal, 1986 (Source: Environmental Solutions, Inc., 1993b.)

The proposed slope configurations for the leach pad ore heap (2H:1V, including benches) ~~is~~ are similar to those used at nearby mining operations, at which no significant slumping or slope failure has occurred. Stability analyses completed for the planned heaps (WESTEC, Inc., 1995) also indicate that the proposed slope of the heap would be stable and unlikely to produce significant failures, either under normal operating conditions or from ground shaking during a regional seismic event. Experience at nearby mines indicates that the proposed final pit wall slope of 1H:1.2V (50 degrees), constructed in cemented alluvium/gravels and metamorphic rock, would provide the required factor of safety for long-term slope stability, including the vibrations from blasting and ground shaking from anticipated seismic events in the region. The proposed pit wall design includes safety benches at regular vertical intervals to contain minor rock falls. The waste rock stockpile slope configurations would also be similar to those used at the Picacho Mine, and no significant slumping or slope failure is anticipated; however, an actual slope stability study has not yet been completed.

Project structures would be designed and constructed subject to the current Uniform Building Code (UBC) Seismic Zone 4 standards, which are the most stringent in the UBC. Implementation of Seismic Zone 4 standards would conform to the current Building Code Requirements of the Imperial County

Planning~~and~~/Building Department, and prevent catastrophic failure of facilities which could endanger human life during seismic events. Therefore, impacts from remote seismic events would not be significant.

No surface ruptures are anticipated from seismic activity because there are no known or currently identified active faults within the Project area. Mining of the proposed pits would not be expected to affect either the physical geology of known faults in the region or regional seismicity.

Loss of Mineral Potential:

Condemnation drilling by Chemgold geologists has been used to determine the limits of the gold ore bodies within the Project mine and process area. The results of this drilling, to date, indicate that valuable mineral resources common to the Project area do not exist in the areas of the proposed heap pad, waste rock stockpiles, and the process and ancillary facilities. Therefore, no potentially valuable mineralization would be buried by the placement of these facilities in these areas.

Backfilling of the West Pit would not result in the burial, and thus loss, of future, potentially valuable economic mineral resources since the mineralization has been structurally offset and downdropped well below the current limits of the mine plan. Since the East Pit and Singer Pit would not be completely backfilled, access to any future potentially economic mineralization below the limits of the current mine plan would not be completely lost.

Subsidence:

No land surface subsidence due to the extraction of ground water from the ground water production wells is expected. Generally, land surface subsidence related to ground water extraction occurs only when the drawdown of the ground water table is large or results in a substantial pressure reduction in a confined aquifer; or a substantial percentage of the earth materials forming the aquifer are fine-grained (silts or clays); or the depth from the surface of the land to the water table is small. Because the amount of ground water the Project proposes to extract is not large compared to the size of the aquifer or the amount of water in storage; because the sediments in the ground water production area are relatively coarse alluvial materials; and because the depth to ground water is greater than 500 feet below ground surface (bgs), measurable subsidence is not expected to occur as a result of the production of ground water. In addition, any subsidence which may occur would not be

located so as to be able to adversely affect any of the Project facilities. The distribution transmission lines needed to provide power to the ground water well pumps can tolerate localized subsidence. There are no other existing or planned developments or natural features in the immediate vicinity of the ground water production wells which could be adversely affected by localized subsidence.

Radioactivity:

Materials to be mined by the Project have not been analyzed for naturally occurring radioactive materials (NORM). However, some analyses from the general area for radon gas and uranium and thorium in soils have been conducted and can be used as an indication of the relative amount of NORM in the Project mine and process area. In 1990 the California Department of Health Services (DHS) conducted an initial phase radon survey by placing short-term radon detectors in approximately 2,858 randomly selected homes (DHS, 1990). Two samples were collected from homes in the Brawley area of Imperial Valley, the results of which indicated radon isotope-222 levels of 1.8 and 1.1 picocuries per liter (pCi/l) of air. These values are significantly below the USEPA recommended level of 4.0 pCi/l at which action should be taken to reduce radon levels. The mining of the proposed West Pit, Singer Pit, and East Pit is not expected to significantly increase the release of naturally occurring radon gas into the atmosphere.

Within an approximately fifteen (15)-mile radius of the Project mine and process area, approximately 37 soil samples were collected as part of the national uranium resource evaluation (NURE) (Hoffman, et al, 1991). The uranium values from these soil samples range from 2.2 to 4.4 ppm, and average 3.0 ppm. The average crustal abundance of uranium is 2.5 ppm (Rose, et al, 1979). The thorium values from the same soil samples range from 4.0 to 21.0 ppm, and average 10.67 ppm. The average crustal abundance of thorium is 10 ppm. In the immediate vicinity of the Project area, two (2) soil samples were collected. The uranium values from these two (2) soil samples are 2.2 and 3.0 ppm, which produce an average of 2.6 ppm. The thorium values from the same two (2) soil samples were 5.0 and 16.0 ppm, which produces an average of 10.5 ppm. Using the radon values in comparison to the USEPA recommended action level, and the uranium and thorium values in comparison to the average crustal abundance of those elements, neither the Project area nor the vicinity appears to have elevated levels of radioactive elements and, therefore, elevated NORM levels would not likely be expected to be produced by operations within the Project mine and process area.

4.1.1.3. Mitigation Measures

Incorporated by Project Design:

- 4.1.1-1: Heap leach pad and waste rock stockpile slopes shall be constructed at overall slopes no steeper than 2H:1V.

- 4.1.1-2: Mine pit slopes shall be constructed at overall slopes no steeper than 1H:1.2V (50 degrees) unless mining conditions and geotechnical factors demonstrate through engineering analysis that steeper slopes would be safe, and such steeper slopes shall be approved by the BLM. Slopes shall not be steeper than is safe considering actual rock strength and structural conditions encountered.

- 4.1.1-3: Approximately 40-foot wide benches ~~Benches~~ shall be constructed at approximately 80-foot high ~~appropriate~~ intervals on mine pit slopes to catch loose rocks. Approval shall be obtained from the BLM prior to construction of mine pit benches which differ substantially from these specifications.

Incorporated by Regulation:

- 4.1.1-4: Project structures subject to the Uniform Building Code shall be designed and constructed consistent with the standards of Seismic Zone 4.

Incorporated to Avoid Potentially Significant Impacts:

- 4.1.1-~~4~~5: To avoid any significant slumping or slope failure of the waste rock stockpile slopes, a slope stability analysis of the proposed waste rock stockpile slope configurations shall be conducted prior to the placement of waste rock on the stockpile, and the results of any study should be followed during the construction of the waste rock stockpile.

  No other mitigation measures are proposed or recommended.

4.1.1.4. Unavoidable Adverse Effects and Level of Significance After Mitigation

There would be no unavoidable adverse effects to geology from implementation of the Proposed Action, and the goal of the Proposed Action is to mine precious metal mineral resources for beneficial use.

Based upon regulatory requirements and mitigation measures that would be incorporated into the Project design, effects of the Proposed Action would be mitigated so that geology or mineral resources impacts would be below levels of significance.

4.1.2. Soil Resources

4.1.2.1. Assumptions and Assessment Guidelines

The Proposed Action would normally have a significant effect on the environment if it would:

- Cause substantial erosion.

4.1.2.2. Impacts of the Proposed Action

Approximately ~~1,400~~ 1,392 acres of surface disturbance is currently anticipated as part of Chemgold's proposed operations within the Project area. However, the Project mine and process area soils are poorly-developed gravelly sands, and only a thin covering of ~~little useful~~ soil is present for Project reclamation and revegetation. Nevertheless, approximately 112,200 cubic yards of soil would be salvaged from all washes and areas where sufficient soil development is noted. Soils would be salvaged to the greatest depth practicable (generally less than 12 inches) and stockpiled for later use during reclamation activities. Soils would be stockpiled at ~~as many as~~ four (4) proposed sites within the Project mine and process area (see Figure 2-2). The soil~~s~~ stockpiles would be clearly identified with signs to assure that the material was not misidentified as waste rock material.

Many of the soils in the Project area, and many of the Project facilities themselves (such as the soil~~s~~ stockpiles, waste rock stockpiles, and heap, etc.), may be subject to erosion, either from precipitation falling directly within the Project area or from flow events in the ephemeral washes. To minimize erosion, Chemgold has indicated that all mine facilities (including the heap leach facility, waste rock stockpiles, soil stockpiles, and roads) would be designed and constructed with erosion control features engineered to meet the performance standards at 14 CCR 3706 (see Section 2.1.11). The Project would also be required to be constructed and operated in accordance with a Storm Water Pollution Prevention Plan, which requires the use of Best Management Practices for erosion control, in accordance with the California Storm Water National Pollution Discharge Elimination System (Storm Water NPDES) permit program (California Water Code Section 13000 *et seq.*).

Surface runoff and drainage from disturbed areas within the Project mine and process area would be controlled, collected, conveyed to sediment basins, and infiltrated (or consumed in mining or the heap leach process). Any areas which might be susceptible to erosion from surface flows would be protected through the use of berms, sediment ponds, rip- rap, check- dams composed of straw bales, sand bags, silt fences, or other techniques to prevent erosion and potential damage. Erosion control methods would be designed to handle a 20-year/1-hour intensity storm event, in accordance with standards established by 14 CCR 3706(d) (SMARA regulations). Modifications to the erosion control methods would be made as necessary over the life of the Project.

Several ephemeral drainages would be temporarily, and eventually permanently, diverted around the Project facilities. Rip- rap would be placed along the channel banks only in the temporary channels to the extent necessary to prevent erosion. Each diversion would channel the flow into another existing wash which was tributary to the same major wash, thus putting all flow back into the same drainage system. Diversion channels would also be built to approximate the original drainage system in both gradient and channel geometry. This would minimize changes in the hydraulic characteristics of the channel and minimize the potential to increase any erosion from the wash. ~~Energy dissipators would be constructed at the end of the diversion channels to minimize the potential of erosion from the diverted flows.~~

Because the washes which flow through the Project mine and process area continue downgradient to the southwest until each eventually ends in individual areas of infiltration on the eastern edge of the Algodones Sand Dunes (see Figure 3-14), there would be no impacts from erosion, sedimentation, or diversion of ephemeral stream channels on any areas outside of the drainage basin, including the Fort Yuma Indian Reservation or Picacho Wash.

4.1.2.3. Mitigation Measures

<u>Incorporated by Project Design</u>:

- 4.1.2-1: Surface disturbance shall be kept to the minimum that is required to construct and operate the project.

- 4.1.2-2: Soils shall be salvaged from all areas where sufficient soil development is noted in conformance with the approved Reclamation Plan. Soils shall be salvaged to the greatest depth practicable and placed in stockpiles clearly delineated with signs to assure the material is not mistaken as waste rock.

- 4.1.2-3: All mine facilities shall be designed and constructed with erosion control features engineered to meet the performance standards ~~at~~ of 14 CCR 3706, including the control of runoff and protection of areas susceptible to erosion from surface flows.

Incorporated by Regulation:

- 4.1.2-4: A Storm Water Pollution Prevention Plan (SWPPP), incorporating the use of Best Management Practices for erosion control, shall be developed and implemented in accordance with the California Storm Water NPDES permit program.

Incorporated to Avoid Potentially Significant Impacts:

No other mitigation measures are proposed or recommended.

4.1.2.4. Unavoidable Adverse Effects and Level of Significance After Mitigation

Implementation of the Proposed Action would result in the unavoidable loss of those soils which cannot be salvaged during construction.

Based upon regulatory requirements and mitigation measures that would be incorporated into the Project design, effects of the Proposed Action would be mitigated so that impacts to soil resources would be below levels of significance.

4.1.3. Hydrologic Resources

4.1.3.1. Surface Waters

4.1.3.1.1. Assumptions and Assessment Guidelines

The Proposed Action would normally have a significant effect on the environment if it would:

- Substantially degrade water quality;
- Contaminate a public water supply;
- Cause substantial flooding or siltation; or
- Substantially alter surface flow conditions, patterns, or rates.

4.1.3.1.2. Impacts of the Proposed Action

Stream Flow Alterations:

The construction of the Proposed Action would include the diversion of segments of three (3) existing ephemeral watercourses, and the permanent filling or excavation of other segments of these watercourses. All diversions divert water entering the Project mine and process area to washes which then flow through the Project mine and process area (see Figure 2-7).

Although these diversions result in a substantial alteration to surface water drainage patterns within the Project mine and process area, because each diversion would channel the flow into another existing wash which was tributary to the same major watercourse, all of the diverted flow would be directed back into the same drainage system. ~~Energy dissipators would also be constructed at the end of the diversion channels, if necessary, to minimize the potential of erosion from the diverted flows.~~ All other storm water surface flows which would not impact Project facilities would be allowed to flow through the Project mine and process area. Thus, all flows would continue in the same channels outside of the Project mine and process area, and there should be no substantial alteration of stream flows or patterns outside of the Project mine and process area.

Precipitation falling within the open pit boundaries would collect on, or infiltrate through, pit floors, thus reducing potential storm water runoff from the Proposed Action compared to the existing desert floor. Precipitation falling on the heap leach pad or within the pregnant or barren ponds would also remain within this closed hydrologic system. Surface runoff and drainage resulting from precipitation falling on the waste rock stockpiles, soil stockpiles, or on project roads and other disturbed areas within the Project mine and process area would be controlled, collected, conveyed to sediment basins, and infiltrated (or consumed in mining or the heap leach process). - Depending on the porosity and permeability of the mine facility and the intensity of the precipitation, storm water runoff may be delayed (such as from rain falling on the porous waste rock stockpiles) or accelerated (such as from the relatively impervious roads). Because the Project mine and process area facilities which may "capture" precipitation are such a minor percentage of the overall surface area of the drainage basins in which they are located, only a very minor reduction in storm water flow downstream from the Project mine and process area would result from the "capture" of precipitation falling within the mine pits and the heap leach system.

Stream Sedimentation and Quality Degradation:

The principal washes within the Project mine and process area appear to be "in balance," meaning that they appear to be neither depositing nor eroding sediment within the Project mine and process area (see Section 3.3.1.3). However, there is a potential for the erosion of materials from the Project soil stockpiles, waste rock stockpiles, and other Project facilities into the washes due to overland storm flow or from erosion by flows in the washes themselves during major precipitation events. Substantial erosion of Project facilities could result in substantial discharge of sediment into the watercourses, which could lead to the deposition of substantial sediment in these watercourses downstream of the Project mine and process area, and which could damage or bury the vegetation in the washes. Areas most susceptible to erosion, and thus the production of sediment, would be steep, loose, waste rock or soil stockpile slopes adjacent to the major throughgoing watercourses; the outside banks of major turns in the washes, and the two (2) new crossings of the western-most wash adjacent to the Project mine and process area by the relocated Indian Pass Road.

Chemgold has incorporated specific measures to reduce the potential for erosion (see Section 4.1.2.3), which would also substantially reduce the potential for sedimentation. These include placing rip rap on the outside bends of diverted stream channels, providing setbacks of facilities (such as the waste rock stockpiles) from the banks of throughgoing washes, and placing berms around facilities as appropriate. In addition, Chemgold has committed to comply with the conditions of the Storm Water NPDES General Permit applicable to the project, and would prepare and follow the requirements of the Storm Water Pollution Prevention Plan (SWPPP) to control drainage and erosion. As a result, the Proposed Action is not anticipated to produce substantial sediment into the washes.

Substantial quantities of various chemicals would be stored and used within the Project area (see Section 2.1.9.4), and substantial quantities of regulated waste (such as waste oil) would be generated (see Section 2.1.9.5). These materials could be released into the watercourses which flow through the Project area, either through spills directly into the washes or from overland flow of either the spilled material or contaminated soil. Minor spills of chemicals and regulated wastes are to be expected during the life of the Project, but should not result in any substantial degradation of surface water quality if promptly contained and collected and properly disposed of off of the site. Chemgold has incorporated specific measures into the Project to reduce the potential for spills of chemicals or regulated waste, and has incorporated

measures to reduce erosion and sedimentation which may transport spilled materials or wastes to the watercourses, which together should substantially reduce the potential for any surface water degradation to insignificance.

The heap leach pad system (heap, pad, ponds, etc.) would be designed to provide for 100-percent containment of the precipitation from the maximum probable one (1)-hour storm event occurring simultaneously with a 24-hour power outage while still maintaining a two-foot freeboard in the process and overflow ponds (see Section 2.1.8). This would greatly limit the potential for failure of the process facilities during high precipitation events which might otherwise result in a discharge of process solution and sediment to the natural drainage channels. In addition, the Waste Characterization Study (EMA, ~~1996~~ 1995) conducted on samples of waste rock and leached ore concludes that these materials are all properly classified as non-acid generating wastes, and that the leachates which may be formed from precipitation moving through the waste rock or leached ore would have very low concentrations of metals.

~~Pit~~ Water: GW Inflow

The East Pit and West Pit would each intercept the local ground water table at elevations of between 211 feet and 88 feet AMSL~~?~~, respectively. Thus, the projected final pit floor elevation of both the East Pit and the West Pit would intersect ground water within the bedrock aquifer. Because of the low permeability and porosity of the bedrock below the ground water table, little ground water is expected to enter the pits. Hydrologic investigations conducted by or on behalf of Chemgold within the proposed pit areas indicate that hydraulic conductivity in the bedrock is very low (WESTEC, Inc., 1996), although the quantity and quality of the acquired data leaves the results somewhat questionable. ? However, ~~In addition,~~ information collected by Chemgold to date indicates that the flow of substantial amounts of ground water from the alluvium bedrock contact into the open pits is highly unlikely. ~~, including~~ This is supported by the fact that approximately 60 percent of the exploration holes drilled in and around the proposed pits have been drilled using dry methods, and only a trace of water has been detected at the alluvium/bedrock contacts (see also Figure 3-9 and Figure 3-10).~~, indicates that the flow of substantial amounts of ground water from the alluvium bedrock contact into the open pits is highly unlikely.~~ Should ground water be encountered in the pits during mining operations, it would be utilized in dust control operations, or collected and used in process operations.

runoff or direct precipitation

Estimates

Because the project pit inflow ~~predictions~~ are based on limited ~~data~~, drill hole data

For the event project pit inflow data are

After the cessation of mining activities, it is possible that ground water ~~infilt~~ ~~inflow~~ seepage (and/or rain water) may accumulate in the bottom of the East Pit~~, which is not proposed to be backfilled under the Proposed Action~~. Calculations ~~combining~~ based on projected ground water inflow to the pit ~~inflow~~, annual precipitation, and annual evaporation for the East Pit indicate that the estimated annual evaporation rate is approximately 170 times the annual estimated ground water and precipitation inflow rate (WESTEC, Inc., 1996). Because the project pit inflow data may be questionable, additional ~~Additional~~ calculations using higher ~~even more conservative~~ hydraulic conductivity values were conducted which indicated that annual evaporation would still exceed annual inflow (~~personal communication,~~ Personal Communication - J. Heggeness, WESTEC, Inc., 1996). Thus, the formation of a pit lake in the bottom of the East Pit after the cessation of mining activities is not likely to occur ~~probable~~.

~~the~~ to

needs rewording!

Chemgold has, as part of the Proposed Action, proposed to backfill the West Pit with waste rock and committed to conduct an assessment at the end of mining and to backfill the East Pit with waste rock to an elevation which would ensure that no standing water would remain in the pit bottom if the assessment indicates that there is a reasonable potential for a pit lake to form, which further reduces the potential for the formation of a pit lake. However, the formation of localized seasonal seeps or moist areas in the East Pit remains a possibility.

~~The quality of any pit water may be estimated though the results of the Waste Characterization Study (EMA, 1996 1995; see Appendix B C-1) conducted on samples of waste rock and leached ore. This study concludes that the waste rock and leached ore are properly classified as non-acid generating wastes, and that the leachates which may be formed from slightly acidic precipitation (or other slightly acidic waters) moving through these materials would have very low concentrations of metals. Specifically, the metal concentrations analyzed from the SPLP leachate tests on these materials were, with one exception, each below the corresponding State of California maximum contaminant levels (MCLs) for drinking water (the analyzed level of barium was as high as 1.4 mg/l, slightly above the MCL for barium of 1.0 ppm). The quality of this leachate was also suitable for non-potable use such as mining and milling.~~

4.1.3.1.3. Mitigation Measures

Incorporated by Project Design:

See also those measures described in Section 4.1.2.3 designed to mitigate erosion and Section 4.1.5.4 designed to mitigate wildlife impacts.

- 4.1.3.1-1: Major watercourses shall be diverted only to the extent necessary to protect Project facilities, and shall be diverted back into the same wash system after as short a diversion as practical. Permanent diversion channels shall be built to approximate the original drainage system in both gradient and channel geometry, and ~~Appropriate energy dissipators shall be constructed at the point of discharge into the pre-existing watercourses, and along banks subject to high erosion potential (such as the outside banks of turns) to minimize the potential for erosion. Diversion channels~~ shall be engineered to adequately contain and deliver stream flows resulting from the 100-year/24-hour precipitation event.

- 4.1.3.1-2: All chemicals shall be stored in conformance with applicable local, state and federal regulations. All non-mining wastes shall be stored in secondary containment area and disposed of offsite in an approved landfill. Regulated wastes shall be recycled or disposed of in conformance with all applicable local, state and federal laws and regulations, and in a manner approved by the responsible regulatory agencies.

- 4.1.3.1-3: Major maintenance of equipment shall be conducted within the concrete-paved and bermed areas of the maintenance yard to the extent possible to minimize accidental discharges of waste lubricants and other materials to the ground.

- 4.1.3.1-4: Each phase of the heap leach pad system (heap, pad, ponds, etc.) shall be designed to provide for 100-percent containment of the precipitation from the maximum probable one ~~(1)~~-hour storm event occurring simultaneously with a 24-hour power outage while still maintaining a two-foot freeboard in the process and overflow ponds, or consistent with the requirements of the CRWQCB.

Incorporated by Regulation:

See those measures described in Section 4.1.2.3 designed to mitigate erosion.

Incorporated to Avoid Potentially Significant Effects:

- 4.1.3.1-5: Sufficient protective measures, such as set-backs or rip rap, shall be designed and employed to ensure that the pregnant, barren, and overflow ponds will not be exposed to erosion or overtopping by storm flows in the natural watercourse located immediately to the east.

No other mitigation measures are proposed or recommended.

4.1.3.1.4. Unavoidable Adverse Effects and Level of Significance After Mitigation

Unavoidable adverse effects to surface water flow within the Project mine and process area would result from implementation of the Proposed Action.

Implementation of the measures incorporated into the Project design, construction, and operation; incorporated by regulation; and recommended, should keep effects to surface water resources from implementation of the Proposed Action below the level of significance.

4.1.3.2. Ground Waters

4.1.3.2.1. Assumptions and Assessment Guidelines

The Proposed Action would normally have a significant effect on the environment if it would:

- Substantially degrade water quality;
- Contaminate a public water supply;
- Substantially degrade or deplete ground water resources; or

- Interfere substantially with ground water recharge.

4.1.3.2.2. Impacts of the Proposed Action – this is a repeat – see pg. 4-9. move up

Ground Water Production:

Ground water would be produced to supply water for heap leach processing and other service water requirements. ~~Up~~ A total of up to 1,000 gpm, or 1,200 afy, of ground water would be supplied from up to four (4) wells drilled in the Project ancillary area southwest of the Project mine and process area ~~or in the Project mine and process area itself~~.

The projected drawdown of ground water levels in the vicinity of the Project ground water well(s) as a function of time were calculated using data collected during the test of ground water exploration well PW-1 (WESTEC, Inc., 1996; see Table 4-2). These calculations assumed an individual ground water supply well, located in the vicinity of ground water exploration well PW-1, would produce approximately 725 gpm, or 1,170 afy, for 20 years. An average hydraulic conductivity of 16 ft/day was assumed for all calculations. Several different drawdown scenarios were calculated using a range of aquifer parameters. The calculations were performed using an aquifer thickness of 300 feet to 600 feet, and a storage coefficient ranging from 0.02 to 0.002. The calculations show that drawdowns ~~of~~ ranging from ~~1.6~~ 1.5 feet to 6.4 feet are projected to occur at distances of approximately 50,000 feet (approximately nine and one-half (9.5) miles) from the pumping well after 20 years of continuous pumping (WESTEC, Inc., 1996). Maximum predicted drawdown at a distance of 1,000 feet from the modelled water supply well is 19.2 to 24.4 feet. These results would ~~be~~ likely be conservative because they assume no recharge of the ground water basin (previously estimated at 100,000 afy); assume all wells would be located in the same aquifer as the production well; and assume ~~a~~ conservative thicknesses for the aquifer (thicknesses of 1,000 feet have actually been measured).

Table 4-2: Summary of Calculated Well Drawdown After 20 Years

Pumping Rate (gpm)	Aquifer Thickness (ft)	Transmissivity (ft^2/day)	Storage Coefficient	Distance to Drawdown Contour in feet			
				1,000	10,000	20,000	50,000
725	300	4,800	0.02	19.2	8.6	5.4	1.8
725	400	6,400	0.02	14.9	6.9	4.5	1.7
725	500	8,000	0.02	12.2	5.8	4.0	1.6
725	600	9,600	0.02	10.4	5.1	3.4	1.5
725	300	4,800	0.002	24.4	13.8	10.6	6.4
725	400	6,400	0.002	18.8	10.8	8.5	5.3
725	500	8,000	0.002	15.4	9.0	7.1	4.6
725	600	9,600	0.002	13.0	7.7	6.1	4.0

Conservative ground water level drawdowns were also calculated for three (3) specific wells located in the vicinity of the Project: the Gold Rock Ranch well, located approximately four and one-half (4.5) miles from well PW-1; the Mesquite Mine well GF-3A, located approximately eight (8) miles from well PW-1; and the American Girl Mine well 26-2, located approximately eight (8) miles from well PW-1 (WESTEC, Inc., 1996; see Table 4-3). For an aquifer with a thickness of 500 feet (a saturated thickness of 500 feet was used for the alluvial aquifer to account for the thickening of the aquifer to the southwest, (Dutcher, et. al., 1972)) and a storativity value of 0.02, a Project well pumping at a rate 725 gpm over a period of 20 years was predicted to result in a drawdown of 3.7 feet in the Gold Rock Ranch Well, and a drawdown of 1.8 feet in both the Mesquite Mine well and the American Girl Mine well (WESTEC, Inc., 1996). These conservative drawdowns represent a three (3) percent, one-half (0.5) percent, and one and one-half (1.5) percent drawdown of the depth of the Gold Rock Ranch, Mesquite Mine, and American Girl Mine ground water wells, respectively, over the life of the Project.

Table 4-3: Calculated Drawdown of Selected Wells After 20 Years

Pumping Rate (gpm)	Aquifer Thickness (ft)	Transmissivity (ft^2/day)	Storage Coefficient	Gold Rock Ranch Well (126 ft. water column) 4 miles from well	Mesquite Mine Well (470 ft. water column) 8 miles from well	American Girl Mine Well 26-2 (110 ft. water column) 9 miles from well
				(ft of drawdown)		
725	500	8,000	0.02	3.7	1.8	1.8

It is unlikely that any effects of the Project's ground water production would translate into effects to any ground water which may exist beneath Picacho Wash because of the relatively great depth to ground water which may be supported by recharge from the All American Canal and the Colorado River. In addition, a number of published hydrogeologic studies have placed ~~and the likely existence of~~ a ground water divide between the Amos-Ogilby-East Mesa and Picacho Wash Basins, such that ground water would flow away from, rather than toward, the divide (Bedlinger, et.al., 1983; Loeltz, et.al., 1975; and Dutcher, et.al., 1972) ~~basins at a height above the ground water table~~.

sp

Little ground water is found in the alluvial aquifers within the Project mine and process area. This is because there is little recharge from the infrequent rains in the Chocolate Mountains, and the thin alluvial aquifers do not extend down into the water table of the Amos-Ogilby-East Mesa Basin. This water table, found at an elevation of approximately 75 feet in the Project production well field area, is presumed to be recharged by leakage from the All American Canal and the Colorado River in the area between Pilot Knob and the Cargo Muchacho Mountains.

Bedrock in the Project mine and process area has a relatively low permeability, and acts generally as a barrier to the flow of ~~groundwater~~ ground water. Bedrock is not exposed at the surface of the divide between the Picacho Wash and Indian Wash surface drainage basins (elevation approximately 960 feet), and no data (gravity, etc.) has been made available to specifically judge the depth to bedrock. However, bedrock in the divide is assumed to be shallow, no deeper than several hundred feet, since the divide is bounded by the exposed basement rocks of the Cargo Muchacho Mountains on the southwest and the Chocolate Mountains three (3) miles away to the northeast. Further, the depth to basement rock in the Project mine and

process area, located approximately four (4) miles northwest of the divide at an elevation of approximately 860 feet, and at a similar distance from the Chocolate Mountains, is zero (0) to 300 feet (860 to 560 feet AMSL), and exploration drilling to the southeast of the Project mine and process area has also encountered bedrock at relatively shallow depths (Personal Communication, Dan Purvance, Chemgold, Inc., 1996) (see Figure 3-10). Thus, it is very likely that a subsurface bedrock barrier to ground water flow exists between the Indian Wash basin and the Picacho Wash basin at an elevation at least several hundred feet above the elevation of the main basin water table.

Static water levels in the Project mine and process area are as high as 300 feet AMSL, well above the level of the Colorado River/All American Canal in the vicinity of downstream end of Picacho Wash (approximately 120 feet AMSL). The measured static water level in the Project production well field area, at well PW-1, is 72.4 feet, well below the level of the Colorado River/All American Canal.

Comparing the amount of water projected to be extracted during the life of the Project to the estimated usable and recoverable stored water and estimated recharge, the Project should not significantly impact the alluvial ground water resources of the area. The Project's extraction rate of ~~1,170~~ 1,200 afy represents about one (1) percent of the annual recharge of the entire Amos-Ogilby-East Mesa Basin. Over the 20-year projected life of the Project, the Project would use an estimated ~~23,400~~ 24,000 af of water, which represents approximately 0.01 percent of the estimated 230,000,000 af of useable and recoverable water in the Amos-Ogilby-East Mesa Basin (WESTEC, Inc., 1996).

Ground Water Quality:

Given the depth to ground water in the Project area, there is little potential for degradation of ground water quality from accidental spills or leakage of chemicals or regulated wastes from containment areas or from the leach pad facility. Minor spills of chemicals and regulated wastes are to be expected during the life of the Project, but should not result in any substantial degradation of ground water quality if promptly contained and collected and properly disposed of. Chemgold has also incorporated specific measures into the Project to reduce the potential for spills of chemicals or regulated waste.

The heap leach pad has been designed with a dual liner to decrease the potential for any leakage of leach solution. Rigorous inspections would be

required by the CRWQCB Waste Discharge Requirements during the installation of the liner to prevent holes, tears, or incompletely welded seams. The pad is also designed to drain by gravity into the solution collection system and solution ponds so that there is only a minimum layer of saturated drain rock (typically less than one (1) foot) above the liner, thus reducing the hydraulic head across the liner.

Monitoring of both the vadose zone and ground water for evidence of leakage of leach solution would be conducted under the Proposed Action, and would also be required by the Waste Discharge Requirements issued by the CRWQCB. The CRWQCB will typically require monthly sampling of monitoring points and analysis for the constituents of concern (those constituents of the process solution, such as cyanide and select metals, which if detected in the vadose zone or ground water monitoring points would likely indicate a leak). Results would be required to be reported monthly, more rapidly if evidence of a leak is detected. Detected leaks would be evaluated and corrected under the supervision of the CRWQCB, either through excavation of the heaped material and repair of the liner, if the height of the heap at the time of detection of the leak is not too great, or through reducing or eliminating the application of leach solution to the heap over the leak. Leaks are not common place and are usually detected while still small. Remediation of leaked solution is typically not required because the weak cyanide solution degrades rapidly as the pH drops and it is oxidized in the air, and the soil and rock material above the ground water can attenuate the concentrations of the metals. Taken together, these measures reduce the potential for any ground water quality degradation to insignificance.

It is also unlikely that any degradation of ground water in the Picacho Wash area would result from any accidental spills or leakage of chemicals or regulated wastes from Project containment areas or from the leach pad facility. In addition to the presumed bedrock ground water barrier located between the Indian Wash basin and the Picacho Basin, the ground water gradient established by the data presented by WESTEC in its report clearly trends down to the southwest, away from the Project mine and process area toward the area of the Project production well field (near well PW-1), and away from the surface boundary between the Indian Wash and Picacho Wash basins. ~~Static water~~

Pit Water Quality:

As discussed in Section 4.1.3.1.2, the formation of a pit lake in the bottom of the East Pit following the completion of pit mining is not ~~probable~~ likely to occur, and Chemgold has further committed to backfilling the pit to an elevation that is above the predicted level of any pit lake should a study ~~reasonably~~ determine that a pit lake may form (see Section 2.1.3) ~~and it is very likely that any water which does collect from ground water in the bottom of the pit would relatively good quality water~~. Based upon the high acid neutralization potential reported for the samples of waste rock and leached ore in the Waste Characterization Study (see Appendix ~~B~~ C-1), ground water moving through backfilled waste rock (or leached ore) in either the West Pit or East Pit would not be likely to generate acidic waters. In addition, the results of the SPLP extractions conducted on the same rock materials indicate that the ground waters would not be likely to extract substantial quantities of metals from these rock materials, and the ground water quality would likely remain relatively unchanged.

To further assess the potential interactions which may occur between the waste rock, which may be backfilled into either the West Pit or East Pit, and the ground water which may enter either pit, an additional geochemical investigation was conducted (see Appendix C-2). Samples of each of the rock types which may be backfilled into either the West Pit or East Pit were processed by several standard USEPA extraction techniques to conservatively simulate what constituents may be leached from the rock if exposed to ground waters entering a backfilled pit. Modelling was then conducted using analyses of the extracted constituents, analyses of the ground water, and the mineral phases of the rock to evaluate impacts to the ground water after equilibration.

Representative composite samples of each of the principal rock types to be mined (sericite gneiss, biotite gneiss, and gravels) (see Section 3.1.1) were first extracted using USEPA Method 1312, which is designed to determine the mobility of both organic and inorganic constituents in liquids, soils and wastes. It uses a 60/40 weight percent of sulfuric acid/nitric acid diluted with deionized water to a pH of 5.0 added to the solid sample, which is then agitated for 18 hours. The resultant liquid (leachate) is then filtered and analyzed. The analytical results from each of the three (3) samples show that the extracted constituents are in low concentrations, in most cases at or below the respective concentrations in the ground water currently in the undeveloped pits, and are below current California water quality standards except the primary selenium MCL and the secondary manganese MCL (see Appendix C-2).

Additional representative composite samples of four (4) rock types (sericite gneiss, biotite gneiss, volcanics, and gravels) (see Section 3.1.1) were also collected from both the East Pit and West Pit and extracted using USEPA Method 1320, the Multiple Extraction Procedure, which is "designed to simulate the leaching that a waste will undergo from repetitive precipitation of acid rain on an improperly designed sanitary landfill. The repetitive extractions reveal the highest concentration of each constituent that is likely to leach in a natural environment." (USEPA, 1986). As such, this test is very conservative for the types of materials and the environment ~~found within the~~ a geologic backfilled Project pits.

The first Method 1320 extraction uses USEPA Method 1310 (Extraction Procedure (EP) Toxicity Test Method) to extract constituents from the solid by agitating for 24 hours with deionized water which is maintained at a pH of 5.0 with acetic acid. The resulting leachate is then filtered and analyzed. Nine (9) subsequent extractions are then sequentially undertaken on the solid residual in 24 hr. periods using a 60/40 weight percent of sulfuric acid/nitric acid diluted with deionized water to a pH of 3.0, each agitated for 24 hours. The resultant leachate from each extraction is filtered and analyzed.

9? 4 samples used in the EPA 1320 analysis

The analytical results from the six (6) samples show, ~~as expected~~, that the concentration of the constituents ~~extracted during~~ in the first extraction are much higher than in ~~the~~ subsequent extractions (see Appendix C-2). TDS and alkalinity concentrations were uniformly higher than in the ground water in the first extraction for all rock types, as were the concentrations of aluminum, calcium, and manganese. The pH was also uniformly lower than the ground water, reflecting the acidic extraction fluid. Concentrations of copper, lead, potassium, strontium, titanium, zinc, barium, chromium, thallium, beryllium, magnesium, cadmium, arsenic, or silver in the first extractions of some samples also slightly exceeded the respective constituent concentrations in the ground water. Constituent concentrations in extractions 2 through 10 were typically lower than ~~both the~~ concentrations in the [illegible] ground water or extraction 1, although iron concentrations increased in nearly all samples in the later extractions, reflecting the low pH in the extraction fluid and the lack of alkalinity remaining in the sample.

further state why this is not a problem.

The analytical results of the Method 1320 extractions show that high concentrations of calcium and available alkalinity may leach from the backfilled material, probably due to the rigorous leaching procedure and the dissolution of calcite ($CaCO_3$) which is present as a secondary mineral phase in the rocks. The relatively high manganese concentrations in the Method 1320 extraction leachates are also due to the rigorous leaching method

and the dissolution of secondary manganese minerals (oxyhydroxides) in the rock.

Geochemical models were also run to test the effects of the ground water flowing into the pits and equilibrating with the backfilled material under earth surface conditions. The results of these geochemical models were then evaluated relative to existing (background) ground water quality and to the potential impacts to ground water quality downgradient from the pits. Because calcite ($CaCO_3$) is the most reactive mineral phase present in the rocks, the models assumed that inflowing ground water would equilibrate with calcite and with atmospheric carbon dioxide (CO_2). The model inputs were derived from the analytical results of the ground water samples collected in the areas of the pits, the Method 1312 extractions, and the Method 1320 extractions. The results of all of the geochemical models ~~show~~ predicts that the dissolved constituent concentrations present in the ground water which has equilibrated with the backfilled material in the pits will be at, or below, the current concentrations present in the ground water. Therefore, no impacts to ground water quality are expected to occur from the complete or partial backfilling of any of the Project pits.

4.1.3.2.3. Mitigation Measures

Incorporated by Project Design:

See also those measures described in Section 4.1.3.1.3 designed to mitigate water quality degradation from chemical spills and use, Section 4.1.12.3 designed to respond to and remediate any chemical spills, and Section 4.1.5.4 designed to eliminate the possibility of a pit lake in the East Pit to mitigate potential impacts to wildlife.

- 4.1.3.2-1: To prevent excessive drawdown or possible damage to the well or pumping system, ground ~~Ground~~ water production from well PW-1 shall be limited to a maximum average of 550 gpm unless a higher pumping rate, supported by reasonable proof of increased well efficiency, is approved by the ICPBD. The maximum average production rate from each additional production well drilled shall be limited to that rate which prevents excessive drawdown or possible damage to the well or pumping system.

spell out

- 4.1.3.2-2: Ground water production and monitoring wells shall be plugged and abandoned in conformance with applicable regulatory requirements, including 14 CCR 3713(a).

- 4.1.3.2-3: The total maximum production rate from all of the ground water production wells shall not exceed 1,000 gpm, and the total annual ground water production rate shall not exceed 1,200 afy.

<u>Incorporated by Regulation</u>:

- 4.1.3.2-~~3~~4: The heap leach pad shall be designed, constructed and operated in conformance with the specifications, requirements and prohibitions of Waste Discharge Requirements issued by the CRWQCB.

- 4.1.3.2-~~4~~5: The heap leach pad shall be monitored in conformance with the requirements of the Monitoring and Reporting Program issued by the CRWQCB.

<u>Incorporated to Avoid Potentially Significant Effects</u>:

No other mitigation measures are proposed or recommended.

4.1.3.2.4. Unavoidable Adverse Impacts and Level of Significance After Mitigation

Implementation of the Proposed Action will result in the unavoidable loss of ground water produced from the ground water production field, and may result in the unavoidable loss of minor quantities of ground water if exposed as seeps in the walls of the East Pit after the cessation of mining.

Based upon regulatory requirements and mitigation measures that would be incorporated into the project design, effects of the Proposed Action would be mitigated so that impacts to ground water resources would be below levels of significance.

4.1.4. Air Resources

4.1.4.1. Assumptions and Assessment Guidelines

The Proposed Action would normally have a significant effect on the environment if it would:

- Violate any regulatory requirement of the ICAPCD; or
- Violate any ambient air quality standard; or

- Contribute substantially to an existing or projected air quality violation; or

- Expose sensitive receptors to substantial pollutant concentrations.

4.1.4.2. Impacts of the Proposed Action

Air Pollutant Emission Sources and Emissions:

The proposed Project consists of many activities and operations, each of which may have the potential to emit air pollutants. A list of each of the identified individual potential sources of Project air pollutant emissions ("emission units"), organized into "emission groups" of similar activities (such as mining, heap leaching, etc.), are presented in Table 4-4.

In addition to being organized into emission groups, these emission units can also be characterized by the "type" of emission unit. Four (4) different types of emission units are applicable to the Project: stationary "point" sources (e.g., the diesel-fuel emergency electric generator); "fugitive" sources (i.e., those which do not emit pollutants from single points, but from diffuse areas (e.g., dust generated by vehicles moving on unpaved roads or windblown dust)); mobile combustion sources (e.g., the "tailpipe" emissions from haul trucks, dozers, etc.); and "other" sources (e.g., vapor emissions from the storage of fuel in storage tanks). Table 4-4 also lists the emission "type-" of each of the Project emission sources.

Table 4-4: List of Potential Emission Sources and Type for the Proposed Action

Emission Unit	Emission Unit Description	Emission "Source" Type			
		Point	Fugitive	Mobile	Other
Emission Unit Group 1: Mining Activity					
1.001	Drilling - Waste Rock		X		
1.002	Drilling - Ore		X		
1.003	Blasting - Waste Rock		X		
1.004	Blasting - Ore		X		
1.005	Waste Rock Loading		X		
1.006	Ore Loading		X		
1.007	Waste Rock Dumping		X		
1.008	Ore Dumping		X		
1.009	Waste Rock Dozing		X		
1.010	Waste Rock Hauling		X		
1.011	Ore Hauling		X		
1.012	Ammonium Nitrate Prill Silo Loading	X			
1.013	Ammonium Nitrate Prill Silo Unloading	X			
1.014	Wind Erosion (Waste Rock Stockpile)		X		
1.015	Wind Erosion (Soil Stockpiles)		X		
1.016	Haul Truck (Combustion)			X	
1.017	Mine Dozer (Combustion)			X	
1.018	Drill Rig (Combustion)			X	
1.019	Loader (Combustion)			X	
1.020	Clean-Up Loader (Combustion)			X	
Emission Unit Group 2: Heap Leaching Activity					
2.001	Portable R-O-M Lime Silo Loading	X			
2.002	Portable R-O-M Lime Hopper Loading	X			
2.003	Lime Application to Ore		X		
2.004	Ore Ripping/Spreading/Dozing		X		
2.005	Grader (Combustion)			X	
2.006	Heap Leach Dozer (Combustion)			X	
2.007	Cyanide Application and Leaching		X		
2.008	Pregnant Solution Pond		X		
2.009	Barren Solution Pond		X		
2.010	Wind Erosion (Heap Leach Pad) - Non-Leach		X		
2.011	Wind Erosion (Heap Leach Pad) - Leach		X		

Emission Unit	Emission Unit Description	Emission "Source" Type			
		Point	Fugitive	Mobile	Other
	Emission Unit Group 3: Process Plant				
3.001	Carbon Adsorption Tank 1		X		
3.002	Carbon Adsorption Tank 2		X		
3.003	Carbon Adsorption Tank 3		X		
3.004	Carbon Adsorption Tank 4		X		
3.005	Carbon Adsorption Tank 5		X		
3.006	Acid Wash Tank		X		X
3.007	Cyanide Make-up Tank		X		
3.008	Strip Tank		X		
3.009	Electrowinning Cell		X		X
	Emission Unit Group 4: Refining				
4.001	Mercury Retort Furnace (Electric)	X			
	Emission Unit Group 5: Laboratory				
5.001	Jaw Crusher	X			
5.002	Pulverizer	X			
5.003	Fume Hood	X			
5.004	Waste Acid Tank		X		
	Emission Unit Group 6: Shop Area				
6.001	Main Diesel Tank 1				X
6.002	Street Diesel Tank				X
6.003	Unleaded Gasoline Tank				X
6.004	Coolant Tank				X
	Emission Unit Group 7: Mine & Process Area Support Activities				
7.001	Water Truck (Combustion)			X	
7.002	Water Truck Traffic		X		
7.003	Backup Diesel-Fueled Generator	X			
	Emission Unit Group 8: Other Mobile Emission Units				
8.001	On-Site Delivery Truck Traffic		X		
8.002	On-Site Light Vehicle Traffic		X		
8.003	Off-Site Delivery Truck Traffic		X		
8.004	Off-Site Light Vehicle Traffic		X		
8.005	On-Site Delivery Truck (Combustion)			X	
8.006	On-Site Light Vehicle (Combustion)			X	

Estimates of the annual emissions of each applicable criteria air pollutant from each emission unit were prepared using generally available emission estimating techniques and operational parameters for each of the emission units as provided by Chemgold, assuming the implementation of the "emission control" techniques proposed to be implemented as a part of the Proposed Action to reduce emissions (such as the watering of roads) [see Appendix L of this EIS/EIR]. Table 4-5 provides a summary of the maximum estimated daily (in pounds per day) and annual (in tons per year) regulated (criteria) air pollutant emissions expected from the Project.

Table 4-5: Summary of Total Calculated Emissions of Regulated Air Pollutants

Emission Unit No.	Emission Unit Description	Regulated Air Pollutants											
		TSP		PM10		SOx		NOx		CO		VOCs/ROGs	
		(lbs/day)	(tons/yr)	(lbs/day)	(tons/yr)	(lbs/day)	(tons/yr)	(lbs/day)	(tons/yr)	(lbs/day)	(tons/yr)	(lbs/day)	(tons/yr)
Emission Unit Group 1: Mining Activity													
1.001	Drilling - Waste Rock	5.27	0.97	2.63	0.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.002	Drilling - Ore	1.76	0.32	0.88	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.003	Blasting - Waste Rock	50.00	1.97	25.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.004	Blasting - Ore	0.00	0.66	0.00	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.005	Waste Rock Loading	50.80	8.56	24.03	4.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.006	Ore Loading	16.93	2.85	8.01	1.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.007	Waste Rock Dumping	125.09	21.07	59.17	9.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.008	Ore Dumping	41.70	7.02	19.72	3.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.009	Waste Rock Dozing	33.72	6.15	4.31	0.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.010	Waste Rock Hauling	96.16	16.20	28.85	4.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.011	Ore Hauling	32.05	5.40	9.62	1.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.012	Ammonium Nitrate Prill Silo Loading	0.50	0.05	0.25	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.013	Ammonium Nitrate Prill Silo Unloading	0.30	0.05	0.15	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.014	Wind Erosion (Waste Rock Stockpile)	17.94	3.05	8.97	1.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.015	Wind Erosion (Soil Stockpiles)	4.49	0.76	2.24	0.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.016	Haul Truck (Combustion)	110.58	20.25	57.50	10.53	194.92	35.69	1,787.35	327.30	771.29	141.24	84.96	15.56
1.017	Mine Dozer (Combustion)	6.34	1.16	3.30	0.60	13.36	2.44	122.55	22.37	52.88	9.65	5.83	1.06
1.018	Drill Rig (Combustion)	38.33	7.09	19.93	3.69	18.64	3.45	283.52	52.48	61.07	11.30	22.50	4.16
1.019	Loader (Combustion)	15.78	2.88	8.21	1.50	16.80	3.07	183.01	33.40	53.13	9.70	23.24	4.24
1.020	Clean-Up Loader (Combustion)	4.18	0.76	2.18	0.40	4.46	0.81	48.53	8.86	14.09	2.57	6.16	1.12
	SUBTOTAL - EMISSION UNIT GROUP 1:	651.92	107.25	284.93	46.59	248.18	45.46	2,424.96	444.40	952.47	174.46	142.70	26.15

Emission Unit No.	Emission Unit Description	Regulated Air Pollutants											
		TSP		PM10		SOx		NOx		CO		VOCs/ROGs	
		(lbs/day)	(tons/yr)	(lbs/day)	(tons/yr)	(lbs/day)	(tons/yr)	(lbs/day)	(tons/yr)	(lbs/day)	(tons/yr)	(lbs/day)	(tons/yr)
Emission Unit Group 2: Heap Leaching Activity													
2.001	Portable R-O-M Lime Silo Loading	0.14	0.01	0.07	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.002	Portable R-O-M Lime Hopper Loading	0.65	0.11	0.65	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.003	Lime Application to Ore	0.08	0.01	0.04	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.004	Ore Ripping/Spreading/Dozing	29.72	5.42	3.68	0.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.005	Grader (Combustion)	4.08	0.74	2.12	0.39	5.73	1.05	46.61	8.51	10.03	1.83	2.34	0.43
2.006	Heap Leach Dozer (Combustion)	6.34	1.16	3.30	0.60	13.36	2.44	122.55	22.37	52.88	9.65	5.83	1.06
2.007	Cyanide Application and Leaching	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.008	Pregnant Solution Pond	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.009	Barren Solution Pond	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.010	Wind Erosion (Heap Leach Pad) - Non-Leach	8.23	1.40	4.12	0.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.011	Wind Erosion (Heap Leach Pad) - Leach	0.41	0.07	0.21	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SUBTOTAL - EMISSION UNIT GROUP 2:	49.64	8.93	14.17	2.52	19.09	3.48	169.16	30.87	62.92	11.48	8.16	1.49
Emission Unit Group 3: Process Plant													
3.001	Carbon Adsorption Tank 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3.002	Carbon Adsorption Tank 2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3.003	Carbon Adsorption Tank 3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3.004	Carbon Adsorption Tank 4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3.005	Carbon Adsorption Tank 5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3.006	Acid Wash Tank	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3.007	Cyanide Make-up Tank	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3.008	Strip Tank	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3.009	Electrowinning Cell	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SUBTOTAL - EMISSION UNIT GROUP 3:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Emission Unit No.	Emission Unit Description	Regulated Air Pollutants											
		TSP		PM10		SOx		NOx		CO		VOCs/ROGs	
		(lbs/day)	(tons/yr)	(lbs/day)	(tons/yr)	(lbs/day)	(tons/yr)	(lbs/day)	(tons/yr)	(lbs/day)	(tons/yr)	(lbs/day)	(tons/yr)
Emission Unit Group 4: Refining													
4.001	Mercury Retort Furnace (Electric)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SUBTOTAL - EMISSION UNIT GROUP 4:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Emission Unit Group 5: Laboratory													
5.001	Jaw Crusher	1.02	0.19	0.07	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5.002	Pulverizer	1.02	0.19	0.07	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5.003	Fume Hood	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5.004	Waste Acid Tank	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SUBTOTAL - EMISSION UNIT GROUP 5:	2.04	0.37	0.14	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Emission Unit Group 6: Shop Area													
6.001	Main Diesel Tank 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.04
6.002	Street Diesel Tank	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
6.003	Unleaded Gasoline Tank	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.26	0.59
6.004	Coolant Tank	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SUBTOTAL - EMISSION UNIT GROUP 6:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.46	0.63
Emission Unit Group 7: Mine & Process Area Support Activities													
7.001	Water Truck (Combustion)	6.72	1.13	3.50	0.59	11.85	1.99	108.67	18.21	46.90	7.86	5.17	0.87
7.002	Water Truck Traffic	0.11	0.02	0.03	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7.003	Backup Diesel-Fueled Generator	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.38	0.00	0.10	0.00	0.01
	SUBTOTAL - EMISSION UNIT GROUP 7:	6.83	1.15	3.53	0.60	11.85	1.99	108.67	18.60	46.90	7.96	5.17	0.88
Emission Unit Group 8: Other Mobile Emission Units													
8.001	On-Site Delivery Truck Traffic	0.78	0.14	0.23	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8.002	On-Site Light Vehicle Traffic	12.31	2.25	3.69	0.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8.003	Off-Site Delivery Truck Traffic	22.14	4.04	6.64	1.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8.004	Off-Site Light Vehicle Traffic	190.63	34.79	57.19	10.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SUBTOTAL - EMISSION UNIT GROUP 8:	225.85	41.22	67.76	12.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	TOTAL - ALL EMISSION UNIT GROUPS:	936.29	158.93	370.53	62.10	279.13	50.94	2,702.79	493.87	1,062.29	193.90	159.49	29.15

~~By far the~~ The largest proportion of the emission units~~, both in number and total emissions,~~ are the fugitive emission sources, especially emitters of fugitive particulate matter (TSP and PM_{10}). Mining and heap leaching activities, such as blasting, loading, dumping and dozing, release fugitive particulate matter into the air through the physical movement of the ore or waste rock. Ore and waste rock hauling, and truck and vehicle traffic, all generate fugitive particulate matter emissions by traveling on unpaved roads. Finally, wind erosion of both the waste rock stockpiles and ore heap can generate fugitive particulate matter emissions. ~~Many of the PM_{10} emission estimates indicated in the Air Quality Analysis and in Table 4-5 are very conservative, since they do not include certain mitigating circumstances (such as emissions below the rim of the pit, which are not likely to move off-site; or the reduced emissions from inactive heap and stockpiles surfaces), and these values should be considered the maximum, rather than the average or expected, emission rate for each unit.~~

Mobile sources, the next largest category of sources, are principally associated with the mining and heap leaching process. They consist exclusively of large diesel engines which power the haul trucks, dozers, graders, and water trucks. Because of the high percentages of use (many will operate nearly 24 hours per day), these mobile sources will produce substantial quantities of "tailpipe" combustion emissions, such as NO_x, SO_x, and CO.

Most of the mobile sources fall into the category of "non-road engines," generally defined under 40 CFR §89 as internal combustion engines which are in or propel a vehicle ~~which~~ which is not a "road" vehicle, or are portable or transportable, but which do not remain in a fixed location for more than a year. These federal regulations require that "non-road" engines must be manufactured to meet specific emission standards for criteria pollutants, based on the size (hp rating) of the engine and date of manufacture, according to a specific timetable commencing on January 1, 1996. Table 4-6 lists the identified Project "non-road" engines, the size (kW rating) of each, whether the engine will be purchased (in 1997) "new" or "used", and whether the engine will be subject to these new federal emission limitations.

Table 4-6: List of Project "Non-Road" Engines and Applicable Criteria

Engine	Engine Rating	Year of Manufacture	Applicability of 40 CFR 89
Haul Trucks (8)	2,500 hp	1997	No
Dozers (2)	375 hp	1997	Yes
Drill Rig (1)	550 hp	1997	Yes
Loader (1)	1,250 hp	1997	No
Clean-up Loader (1)	690 hp	<1996	No
Water Trucks (2)	1,050 hp	<1996	No
Grader (1)	275 hp	1997	Yes
Back-Up Generator (1)	750 hp	1997	Yes

Based on the Project engine size ratings and their assumed date of manufacture (based on the purchase date), less than half of the Project "non-road" engines would be required to be manufactured to met the new federal emission standards. However, many engine manufacturers are already meeting or exceeding the new emission standards.

Although the Project has a number of stationary point sources, these sources are individually and collectively ~~small~~ minor sources of criteria air pollutant emissions. About one-half (½) of the stationary point sources are combustion sources, which as a class emit substantially more gaseous combustion pollutants (NO_x, SO_x, and CO) than particulate matter.

Finally, the "other" category of criteria pollutant emission sources consists exclusively of the diesel, gasoline and other volatile organic compound storage and dispensing tanks. However, the total quantities of these materials emitted by the Project to the atmosphere are small.

<u>Federal PSD Regulations</u>:

Federal Prevention of Significant Deterioration (PSD) regulations are applicable only to major stationary sources which are either specific types of facilities which emit, or have the potential to emit, 100 tons per year or more of a criteria pollutant, or any facility

which emits, or has the potential to emit, 250 tons per year or more of any criteria pollutant. Most fugitive emissions, however, are not included as applicable emissions under the federal PSD program. Since the few stationary emission units under the Proposed Action emit collectively substantially less than 1 ton per year of any criteria pollutant, the Project is not subject to federal PSD regulations.

Title V of the CAAA:

The CAAA included Title V, which established a very detailed and extensive operating permit system for "major sources" of regulated air pollutants. The ICAPCD has adopted Rule 900 to implement Title V within the District, and USEPA's delegation of authority to implement Title V through Rule 900 became effective on June 2, 1995. Rule 900 is applicable only to "major" sources of air pollutants, which are defined as "a stationary source which has the potential to emit a regulated air pollutant or a hazardous air pollutant (HAP) in quantities equal to or exceeding the lesser of any of the following thresholds:"

"100 tons per year (tpy) of any regulated air pollutant;"

"10 tpy of one HAP or 25 tpy of two or more HAP's; or"

"Any lesser quantity threshold promulgated by the U.S. EPA."

At present, no lower quantity threshold has been set by the U~~.~~S~~.~~ EPA.

To determine the applicability of Title V (Rule 900) to the Project, an inventory of the annual potential to emit for each of the applicable emission units was conducted for the Proposed Action (see Appendix L). Since Title V (Rule 900) is basically applicable only to stationary point sources of criteria (regulated) air pollutants, few of the Project's emission units are included in the Title V applicability for criteria pollutants. The largest applicable annual emission rate ~~of~~ for a single criteria pollutants for the Proposed Action is ~~4.5~~ 0.64 tons per year of ~~NO_2~~ volatile organic compounds/reactive organic gases (VOCs/ROGs); all of this is emitted from the fuel and other organic liquid storage and dispensing facilities ~~emergency generator~~.

HAPs are specifically listed hazardous air pollutants, some of which can be found in many of the natural earth materials which will be mined by the Project; in the fuels used and stored by the Project;

and in the solution used to leach the precious metals from the ore. Current USEPA and ICAPCD guidance provides that reasonably quantifiable HAP emissions from fugitive sources, as well as from stationary sources, must be counted to determine the applicability of Title V for HAPs. The potential HAPs component of the emitted Project particulates has been conservatively estimated by assuming that all of the HAPs contained in the fugitive particulate matter are subject to Title V (Rule 900). Based upon analyses of ore and waste rock samples collected during exploration drilling (see Section 2.1.4), and using the calculated total annual TSP emission estimates (see Table 4-5), the total annual emission of particulate-based HAPs has been estimated at less than ~~0.75~~ 0.01 tons (see Appendix L).

HAPs released as a result of the combustion of diesel fuel and gasoline in mobile engines are not subject to Title V (Rule 900). Because of its limited use, combustion ~~Combustion~~ HAPs from the diesel-fueled emergency generator total less than ~~1 ton~~ one (1) pound (0.0002 ton) per year.* The HAPs released from the leaching solution (principally HCN), which are difficult and unreliable to estimate and may not be subject to Rule 900, are estimated at 9.5 tons per year, slightly less than the 10-tons-per-year Title V threshold for a single HAP. The total annual emission of all potentially applicable HAPs from the Project, including HCN, is ~~slightly more than 11.2~~ approximately 9.9 tons, substantially below the 25 ton Title V threshold (see Appendix L).

As a result, the Project will not be subject to Title V of the CAAA (ICAPCD Rule 900).

<u>New Source Review and Emission Offsets</u>:

Rule 207 of the ICAPCD regulations requires the preconstruction review of new or modified stationary sources to ensure that a project will not interfere with the attainment or maintenance of ambient air quality standards. This rule also states that no net increase in emissions to the air basin will be allowed from new stationary sources with the potential to emit 137 pounds per day (equivalent to 25 tons per year) or more of any nonattainment pollutant or its precursors. Rule 207 also requires that emissions in excess of the 137 pound per day limit be "offset" with an actual reductions of the same pollutant or its precursors. These offsets can be obtained from another source at the same location, and offset at a ratio of 1:1, or

from another source up to 50 miles away at a ratio of 1.2:1. Based upon the emission estimates presented in Table 4-5, which are maximum, not anticipated, emission levels, the Proposed Action will not emit more than 25 tons per year of any nonattainment pollutant or its precursors.

Best Available Control Technology/Reasonably Achievable Control Measures:

Rule 207 of the ICAPCD regulations also requires the application of Best Available Control Technology (BACT) to any new (stationary) emission unit which has the potential to emit 25 pounds per day (approximately 4.5 tons per year) of any nonattainment pollutant or its precursors. The Project contains no applicable emission unit which produces more than 1 ton per year, and thus is not subject to BACT requirements.

ICAPCD Regulation VIII (Fugitive Dust Requirements for Control of Fine Particulate Matter) requires the implementation of Reasonably Available Control Measures (RACM) to reduce the amount of PM_{10} entrained in the ambient air as a result of emissions generated from anthropogenic (man-made) fugitive dust sources generated from within Imperial County. RACM must be applied to any active operation, except as specifically exempted in the regulations. Because the silt content of both the Project ore and waste rock is less than five (5) percent, and most other activities which would generate fugitive PM_{10} are specifically exempted from Regulation VIII, only the use of internal roads for traffic and hauling; the discharge of the lime to the ore trucks; and the soil stockpiles are subject to RACM for PM_{10}. For each of these activities, the Proposed Action already contains one (1) or more of those measures required as RACM: the haul and maintenance roads are watered at least once per day; the lime discharge to the ore trucks is controlled by water sprays; and emissions from the soil stockpiles are controlled through the application of vegetation. Therefore, there is no regulatory requirement for the implementation of any additional measures to reduce emissions of fugitive PM_{10}.

<u>Compliance with Ambient Air Quality Standards</u>:

The principal pollutant of concern emitted by the Project is PM_{10} because of the relatively large quantity of PM_{10} emitted by the Project, the relatively low ambient air quality standard for PM_{10}, and the fact that ~~over 90 percent of~~ nearly all of the Project PM_{10} emissions are from fugitive and mobile sources which are emitted throughout the Project mine and process area. In order to estimate the ambient air concentrations of PM_{10} which may result from Project emissions, computer-aided dispersion modeling for the Project PM_{10} emissions was conducted (see Appendix L). The modelling was conducted with the U~~.~~S~~.~~ EPA Industrial Source Complex - Short Term (ISCST3R) dispersion model, which utilized the Trinity Consultants, Inc. Breeze "graphical front end" (IBM-PC Version 3.00, dated 96113 ~~95250~~). Using U~~.~~S~~.~~ EPA's regulatory default model options and rural dispersion parameters with elevated terrain, emissions from Project were modeled based on hourly emission rates calculated in Appendix L and summarized in Table 4-5 for all sources (fugitive, point, mobile and other) of PM_{10} within the Project mine and process area. Surface meteorological data for the year 1989 from the National Weather Surface (NWS)-operated Yuma Air Station, combined with upper-air data from the NWS-operated Tucson Upper Air Station was used, as it provided the most readily and reasonably available dataset for the modeling.

Three (3) cartesian receptor grids were modelled, as well as a set of discrete receptors placed at 50-meter intervals along the Project mine and process area perimeter fence: a 19-by-19, 1,000-meter spacing, receptor grid, centered on the Project mine and process area which covered approximately 125 square miles; a 21-by-21, 250-meter spacing, receptor grid, also centered on the Project mine and process area, which covered the area closer to the perimeter fence with a finer grid; and an 11-by-21, 100-meter spacing, receptor grid, located over the southwest corner of the Project mine and process area, which covered the area outside the perimeter fence which the other model runs indicated had the highest ambient concentrations. A complete discussion of the modeling conducted, including the parameters used in the model runs and a discussion of the metereological data, is contained in Appendix L to this EIS/EIR.

The computer-calculated maximum ambient 24-hour PM_{10} concentration located at any point on or outside of the perimeter fence

was ~~4.3 5.3~~ 29.6 $\mu g/m^3$, located on the perimeter fence near the southwest~~?~~ corner of the Project mine and process area. Calculated maximum annual PM_{10} concentrations were ~~only 2.8 30.0~~ 5.3 $\mu g/m^3$, also located on the perimeter fence at a point near the southwest~~?~~ corner of the Project mine and process area. Both of these values are ~~well~~ below the applicable California and federal AAQSs (see Table 3-5), even when the background level calculated from the Mesquite Mine (19.9 $\mu g/m^3$) is added. Calculated ambient concentrations at distances greater than ~~2,000~~ 3,750 meters (~~1.2~~ 2.3 miles) from the Project mine and process area boundary were universally below ~~1~~ 5 $\mu g/m^3$. Maximum ambient concentrations at the northern boundary of the Ft. Yuma Indian Reservation, a distance of 12,000 meters (7.5 miles) from the southern boundary of the Project mine and process area, would be far below 1 $\mu g/m^3$ and impossible to distinguish from background concentrations.

Computer modelling of Project emissions to estimate maximum ambient air concentrations of criteria air pollutants other than PM_{10} has not been undertaken. However, some general observations regarding the potential ambient air quality impacts resulting from the Proposed Action activities within the Project mine and process area may be inferred through comparisons with modelling done for on-site activities for the proposed Mesquite Regional Landfill (U.S. Bureau of Land Management, 1994a). Because the emissions of gaseous pollutants are comparable between the two projects (Project-to-landfill ratios are ~~1.81:1~~ 1.22:1 for NO_2; ~~1.93:1~~ 1.64:1 for SO_2; and ~~1.05:1~~ 1:1.32 for CO); the ratios of stationary to fugitive emissions generally similar; and the maximum, off-site, ground-level concentrations of the gaseous air pollutants calculated for the landfill in the reference year (year 16) are so low compared to the regulatory standards (all are less than two (2) percent of the regulatory standard), emissions of NO_2, SO_2, or CO by the Proposed Action are very unlikely to violate any applicable ambient air quality standard for these pollutants.

<u>Exposure of Sensitive Populations</u>:

Project air pollutant emissions will produce very modest increases in the ambient concentrations of both criteria air pollutants and HAPs in the immediate vicinity of the Project mine and process area. However, the Project mine and process area is far removed from any resident population, sensitive or otherwise, which could be exposed to any long-term increase in the ambient concentrations of either

criteria air pollutants or HAPs. Transient populations (i.e., recreational visitors) could be exposed to these minor increases in ambient air concentrations if in the immediate vicinity of the Project mine and process area, although this exposure would be of very short duration and would not be significant.

4.1.4.3. Mitigation Measures

<u>Incorporated by Project Design</u>:

- 4.1.4-1: Water sprays, chemical treatments acceptable to the BLM, or other RACM determined acceptable by the ICAPCD shall be applied to the haul and maintenance roads within the Project mine and process area to minimize the generation of fugitive PM_{10}. If water sprays are used, they shall be applied no less than once per day on days without precipitation unless road surface moisture is documented as sufficient to suppress fugitive dust emissions without additional water.

- 4.1.4-2: Project employees, contractors, and visitors shall be advised of the need to adhere to speed limits to minimize the generation of fugitive dust.

- 4.1.4-3: Shrouding of the lime discharge to the ore trucks and prompt revegetation of the soil stockpiles, or equivalent RACM for these fugitive PM_{10} emissions, shall be implemented and maintained.

- 4.1.4-4: Water sprays or chemical treatments acceptable to the ICPWD shall be applied to Indian Pass Road from its intersection with Ogilby Road to the boundary of the Project mine and process area with sufficient frequency to minimize the emissions of fugitive PM_{10} from Project traffic on Indian Pass Road.

<u>Incorporated by Regulation</u>:

- 4.1.4-~~4-~~5: All permits required by the ICAPCD shall be obtained, and all operations conducted in general compliance with the conditions of these permits.

Incorporated to Avoid Potentially Significant Effects:

- 4.1.4~~-5~~-6: All disturbed surfaces no longer needed for project activities shall be reclaimed as soon as practical to minimize fugitive PM_{10} emissions from wind erosion.

4.1.4.4. Unavoidable Adverse Effects and Level of Significance After Mitigation

Project emissions of criteria air pollutants and HAPs will produce minor increases in the ambient concentrations of both these air pollutants in the immediate vicinity of the Project mine and process area. Application of the recommended mitigation measures will reduce the impacts of all HAPs and all criteria air pollutants to insignificance.~~,~~

4.1.5. Biological Resources

This assessment of the effects of the Project on biological resources is based on the findings described in several biological technical investigation reports of the Project area which are appended to this EIS/EIR as Appendices F, G, H, and I. A summary of the findings of the biological surveys is provided in Section 3.5.6.2. In addition, the findings of a Biological Assessment of the anticipated effects of the Project on the federal and state listed and proposed biological resources in the Project area, prepared on behalf of the BLM (Rado, 1996), have been summarized in this assessment, and the recommended mitigation measures provided in the Biological Assessment have been integrated with measures provided in this EIS/EIR.

4.1.5.1. Assumptions and Assessment Guidelines

To determine the potential significance of the effects of the Project on biological resources, it is necessary to consider the relative importance of the identified biological resources in the vicinity of the Project area and the degree of potential Project-related impacts on these respective resources. As discussed in the regulatory framework for biological resources section of this EIS/EIR, factors utilized to determine the relative importance of the biological resources in the vicinity of the Project are, in part, based on species and habitats afforded protection under both the federal Endangered Species Act (ESA) and the California Endangered Species Act ~~(CECA)~~ (CESA), as well as BLM sensitive species, and other species of concern,

collectively referred to as special-interest species for the purposes of this assessment (see Section 3.5.1).

Based upon NEPA and CEQA guidelines, and commonly accepted criteria, a project would normally be considered to have a significant effect on biological resources if it could:

- Substantially affect a rare or endangered species of animal or plant or the habitat of the species;
- Interfere substantially with the movement of any resident or migratory fish or wildlife species; or
- Substantially diminish habitat for fish, wildlife, or plants.

4.1.5.2. Impacts of the Proposed Action on Vegetation

The Project would impact vegetation primarily through direct destruction of plants by surface disturbance during construction of the mine and ancillary facilities. An estimated ~~1,400~~ 1,392 acres of surface disturbance would result from development of the mine pits, Mineral Potential Area, heap pad, waste rock stockpiles, soil stockpiles, process ponds, haul roads and access road realignment, drainage diversions, well field and pipeline, electrical power line, and ancillary facilities. The surface locations of these facilities are identified on Figure 2-2, and the surface acreage occupied by these principal mine facilities is identified on Table 2-1.

Surface disturbance would occur incrementally throughout much of the life of the Project as individual pits are mined and waste rock stockpiles, soil stockpiles, and process facilities are expanded. Vegetation would be lost as result of: (a) initial surface blading of vegetation, ore processing, stockpiling of soil and waste rock, and construction of surface facilities and access corridors; (b) crushing or damage to vegetation as a result of heavy equipment use and vehicle use and parking; (c) periodic mine exploration activities; and (d) the use of heavy equipment during site reclamation activities. Vegetation existing in the areas of surface disturbance would be destroyed or damaged as a result of removal, crushing, entombment, soil compaction, or root damage.

Vegetation recovery is a function of the type and degree of soil disturbance. Disturbed or compacted soils associated with construction or human activity may take longer to recover than soils disturbed by natural disturbances (i.e., such as flooding), in part because seeds, and perhaps related symbionts (e.g., rhizobial bacteria), may no longer be present (Virginia and Bainbridge, 1987). Revegetation strategies would be implemented to reduce the time involved for natural plant establishment on land disturbed by the Proposed Action. Examples of strategies in desert revegetation studies include soil preparation, (scarification and topsoil restoration), reseeding, transplantation, and plant protection (see Reclamation Plan, provided as Appendix ~~C~~ A). Application of these strategies within the Project area would continue during the life of the revegetation program.

As discussed in the Reclamation Plan, the Project applicant has developed a revegetation program based upon experience gained from revegetation efforts at its Picacho Mine and information provided by qualified experts on desert flora and revegetation. Elements of the revegetation program include:

- Salvaging and stockpiling available soils from the mine and process area for redistribution over disturbed areas during site reclamation.
- Contouring and grading of surfaces to prevent erosion and to promote seed germination. Water catchment basins would be constructed for revegetation on the tops and accessible slopes of the waste rock stockpiles, heap, and permanent diversion channels.
- Monitoring of revegetation plots at the nearby Picacho Mine and concurrent activities at the Project area to adapt successful seeding and revegetation procedures to the revegetation program.
- Collection of a seedbank of seeds from sources within, and in the vicinity of, the Project area to be used to reseed the Project area during site reclamation. Primary seed sources will consist of: (a) seeds in the surface soils salvaged during mine construction from shallow washes; and (b) seeds obtained from selected plant species within, and in the vicinity of, the mine

and process area which would be hand-collected over the life of the Project.

- Preparation of the seedbed to optimize conditions for seed germination.

- Documentation of seed mixtures, seed rates, and application methods demonstrated to be effective in the vicinity of the Project. Seed mixtures would use seeds collected from the immediate area supplemented with additional seeds of plant species approved by the BLM, Imperial County, and the CDFG to increase available deer browse.

- Adopting a schedule for seeding and transplanting selected plant species which optimizes the potential for revegetation success.

- Monitoring for invasion of noxious weeds and salt cedar (*tamarisk* sp.) and implementing a weed control and noxious plant removal program acceptable to the BLM and Imperial County.

- Adopting revegetation goals acceptable to the BLM and Imperial County which target vegetative cover, vegetative diversity, and vegetative density to determine the success of the revegetation program. Revegetation efforts would be amended, as necessary, to reflect the findings of the monitoring activities.

- Implementing a monitoring program to evaluate the success of the revegetation program and a schedule for reporting the findings of the monitoring activities to the BLM and Imperial County.

The Project measures summarized above, and discussed in the Reclamation Plan, would mitigate to a level of nonsignificance the effects of surface disturbance from mine construction and operations on the vegetation within the Project mine and process area.

Up to 1,200 afy of ground water would be produced from the Project ground water well field for use in mining operations. The static elevation of the ground water in the alluvial production reservoir has been measured at 540 feet below ground surface (WESTEC, Inc., 1996). The water table is far below the depth that surface vegetation

could be utilizing the ground water; therefore, anticipated drawdown and lowering of the ground water elevation as a result of the proposed ground water production would not impact surface vegetation. Moisture available from watering of roads and other traffic areas for dust suppression during construction and mining activities could result in a temporary increase in some opportunistic plant species immediately adjacent to active roadways or other watered surface areas.

Similarly, new low spots or drainage areas where water could pond or accumulate within the active portions of the Project mine and process area could result in the introduction of salt cedar or other noxious weeds. Salt cedar could also invade moist pit areas following the completion of active mining activities where water may accumulate; however, these conditions are not expected to exist following the completion of mining (see Section 4.1.3.2.2). Seasonally moist areas within the remnant East Pit could result in small areas (estimated at less than one (1) to two (2) acres of pit bottom) in which salt cedar growth might be supported (Personal Communication - Samuel A. Bamberg, Ph.D.; April 25, 1996).

Of the total ~~1,400~~ 1,392 acres of surface disturbance, an estimated ~~1,300~~ 1,292 acres of the sparse, widely-distributed shrub/scrub vegetation, dominated by creosote bush, characteristic of the upland areas within the Project area, would be affected. The remaining area of surface disturbance, approximately 100 acres, would impact the shrub/tree vegetation (i.e., microphyll vegetation) characteristic of the primary washes and secondary drainages within the Project mine and process area.

Microphyll vegetation also exists in the wash systems downgradient of the Project mine and process area. Concern exists that diversions of the ephemeral drainages around the mine facilities would change the flow of water through the drainages feeding the vegetation in the downgradient wash systems. There is also concern that changes to ephemeral drainages would increase erosion or affect fluvial processes in the streambeds resulting in increased sedimentation or changes in the quality of water flowing through the Project area.

Under the Proposed Action, storm waters in the major ephemeral drainages would either be allowed to flow naturally through the Project area, or would be diverted into channels around the Project facilities and returned to the natural watercourses downgradient of the

Project mine and process area. Each of the diversion channels would be designed to channel the surface flow back into the same major downstream ephemeral drainages from which the flow originated (see Section 2.1.9.7). The permanent channels through the Project mine and process area would be built to approximate the original drainage system in both gradient and channel geometry ~~restored~~ to prevent erosion and ~~would be~~ revegetated with microphyll vegetation.

The Project design measures described above would mitigate to a level of nonsignificance the effects on downstream vegetation from any potential changes in ephemeral stream flow and fluvial processes.

4.1.5.2.1. Impacts to Threatened or Endangered Plant Species

No federal or California listed, proposed, or ~~candidate rare, threatened or endangered~~ special status plant species were observed during the botanical surveys of the Project area. Based on the findings of the site surveys and prior database records, no listed, proposed, rare or ~~candidate~~ special status plants would be affected by this Project.

4.1.5.2.2. Impacts to BLM Sensitive Plant Species

~~Fairy duster:~~ One BLM sensitive plant species, fairy duster, was observed along the edges and banks of the smaller (2- to 8-foot wide) ephemeral drainages within the Project area and in ephemeral drainages throughout the vicinity of the Project area. Individual fairy duster plants would be destroyed and their seed bank potentially lost (i.e., the dormant seeds left by previous years' plants would be buried) as a result of the proposed grading and development activities within the Project mine and process area. Fairy duster occurs over a large geographic area, including the Colorado, eastern Mojave, and Sonoran Deserts. Based on surveys of the Project area, an estimated 500+ plants occur within the Project mine and process area. Since most of the smaller ephemeral drainages in the Project mine and process area would be destroyed as a result of mine construction, essentially all of these fairy duster plants would be ~~loss~~ lost. However, the species is locally common, and can recolonize washes previously disturbed by mining operations (Environmental Solutions, 1987). In addition, design

elements of the Project provided in the Reclamation Plan include the collection of seeds, including fairy duster seeds, from the wash soils for use during reseeding during site reclamation activities. The impact resulting from the loss of individual fairy duster plants within the Project mine and process area is considered to be below the level of significance. While the effects of the Project on the fairy duster would be below the level of significance, measures have been incorporated into the Project design to further reduce the long-term impacts of the Project on this species (see Section 4.1.5.4).

4.1.5.2.3. Impacts to CNPS List 4 Species

One CNPS List 4 ("watch" list) species, the winged ~~forget-me-not~~ cryptantha, was observed within the Project area. This species was reported to exist in low numbers along the banks of the larger ephemeral drainages. Fewer than 60 individual plants were estimated to exist within the Project mine and process area (Rado, 1996). These plants would be destroyed and their localized seed bank within the mine and process area would be potentially lost as a result of surface disturbance during mine construction or processing. This species is widespread in distribution, ranging from the southeastern desert in California into Arizona and Nevada, but it is typically encountered in low densities and numbers of individual plants. The CNPS List 4 status indicates that these plants are not "rare" but are sufficiently uncommon that their status should be monitored. Given the current status and the distribution of the winged ~~forget-me-not~~ cryptantha, the impact from the loss of the observed plants within the Project mine and process area would not exceed the level of significance. While the effects of the Project on the winged ~~forget-me-not~~ cryptantha would be below the level of significance, measures have been incorporated into the Project design to further reduce the impacts of the Project on this species (see Section 4.1.5.4).

4.1.5.3. Impacts of the Proposed Action on Wildlife

4.1.5.3.1. Impacts on Wildlife Habitat

The total area of surface disturbance resulting from Project construction and operation would be ~~1,400~~ 1,392 acres. This would include approximately ~~1,300~~ 1,292 acres of desert scrub habitat and approximately 100 acres of microphyll woodland habitat. The loss of wildlife habitat, particularly the loss of microphyll woodland habitat, would directly or indirectly displace resident birds within or near the Project mine and process area. The Project would also result in an incremental loss of foraging habitat for wildlife ~~and\ or~~ and/or migratory species such as bats and raptors. The effects of the loss of habitat from the Project on wildlife would continue over the life of the Project, and some of the effects would continue for an extended period following site closure. Wildlife would eventually return to the Project area as vegetation re-establishes and disturbed surfaces are reclaimed or recover. However, the projected period before conditions return to an approximate pre-Project status with respect to wildlife carrying capacity may exceed several decades following completion of the active life of the Project (Rado, 1996).

As discussed in Section 3.5.6, the CDFG considers microphyll woodland to be a sensitive habitat. It is considered second only to riparian habitat in wildlife diversity in the desert area, and it is considered a particularly important habitat component to deer and other wildlife species (Personal ~~communication~~ Communication - Nancy Andrew, CDFG). ~~The agency~~ CDFG has a policy for requiring replacement of habitat ~~on-site~~ "on-site" and "in kind" when possible for wetland habitat impacted as a result of proposed projects~~, or requiring habitat offsite "in kind" when on-site habitat replacement is not possible~~. This means that sensitive wetland habitat lost within a proposed project area as a result of proposed project activities would be required to be replaced by the project proponent with the same type and quality of sensitive wetland habitat somewhere within the project area when possible, or outside of the project area when on-site replacement is not possible. Wetland habitat would not be impacted by the Imperial Project, but the CDFG also attempts to adapt this wetland habitat policy

to other ~~sensitive~~ habitats which they consider sensitive, such as microphyll woodland, when evaluating measures to mitigate the biological effects of projects which may require Stream Alteration Agreements (Personal ~~communication~~ Communication - Lilia Martinez, CDFG, 1996). Surface disturbance from the Imperial Project would result in the destruction of approximately 100 acres of microphyll woodland habitat within the Project mine and process area. Diversions of surface drainage through constructed channels around the Project facilities would continue to provide the same flow and quality of water into the wash systems downgradient of the Project mine and process area as exists prior to mine construction. As such, no significant impact on wildlife habitat or species in the wash system downgradient of the Project mine and process area is expected. Similarly, wildlife which may exist in the Algodones Dune foothill "pockets" of microphyll vegetation downgradient of the mine would not be affected by the Project.

The through-flowing surface drainages would be located as close to their original courses as reasonably possible in comparably-sized channel(s) which would tie into the original downgradient wash systems. As discussed in Section 4.1.5.2, the permanently diverted drainages would be revegetated with microphyll vegetation. Following site reclamation, approximately 50 acres of microphyll woodland would be restored. However, as a result of Project construction, some of the affected microphyll woodland acreage cannot be restored within the Project mine and process area, and there would be a net reduction of approximately 50 acres of microphyll woodland in the Project mine and process area as a result of the Project.

~~The initial destruction and subsequent net loss of microphyll woodland habitat as a result of the Proposed Action is considered a significant effect. However, as presented in Section 4.1.5.4, mitigation measures have been proposed to reduce the adverse effects of the Project on microphyll woodland habitat. With the implementation of the proposed mitigation measures, the mitigated effect of the Project on microphyll woodland habitat would be below the level of significance.~~

Measures are incorporated into the Project design to minimize the area of microphyll woodland habitat disturbed by the Project to 100 acres and to mitigate the adverse effects of the Project on microphyll woodland habitat. Site reclamation measures would result in restoration of approximately 50 of these acres of microphyll woodland habitat. However, the initial destruction of approximately 100 acres of microphyll woodland habitat and the ultimate net loss of approximately 50 acres of microphyll woodland habitat from the Project area is considered a significant effect. Mitigation measures are provided for the acquisition of off-site private lands to compensate for the loss of habitat resulting from the Project (see Section 4.1.5.4). Additional measures to mitigate and compensate for the impacts of the Project on the intermittent stream channels and associated microphyll woodland habitat are anticipated as a result of the required Stream Alteration Agreement between the Project Applicant and the CDFG (see Section 4.1.5.4). With the implementation of these mitigation measures, the mitigated effect of the Project on microphyll woodland habitat would be below the level of significance.

4.1.5.3.2. Impacts on Wildlife

Wildlife species which inhabit, move through, or forage within the approximately ~~1,400~~ 1,392 acres of surface area to be disturbed within the Project area would be subject to increased mortality or displacement. Increased mortality would result from direct physical impacts or entombment during construction or processing activities; or indirect mortality from stress or increased predation pressure resulting from displacement into offsite areas.

Over the life of the Project, additional injuries and mortality to wildlife would be expected to result from impacts with motor vehicles commuting to the Project area and other equipment traveling to and from the Project mine and process area and the ancillary area. Experience in other remote areas suggests that reduced speed limits on public roads as a measure to minimize inadvertent vehicle impacts with wildlife is impractical to enforce. Individual animals could also be subject to: (a) drowning in mine process fluid impoundments; (b) increased mortality from exposure to process chemicals

within the solution ponds; (c) injury or mortality during on-site blasting and continued mining operations and exploration activities; and (d) increased mortality from project-related stresses, including night lighting, continuous noise and human activity, or restricted movement in the vicinity of the Project mine and process area. Some species might also come under increased pressure from opportunistic predators (i.e., ravens, coyotes and kit foxes) attracted to the Project area by increased water availability, refuse, or noise.

Noise-sensitive species would be expected to avoid both the Project area and neighboring areas over the life of the Project, but would be expected to return to the area when noise generating operations are discontinued. Similarly, species intolerant of surface disturbance and human activities would also be expected to avoid the Project area and neighboring areas over the life of the Project.

An existing section of transmission line would be upgraded and a new transmission line would be constructed to provide electrical power to the Project mine and process area. Temporary and short-term impacts on wildlife would occur during pole placement and line stringing activities as a result of minor surface disturbance and human presence. The transmission line could also increase the availability of potential perch sites for bird predators in the area which could result in an increase in predatory pressure on wildlife species comprising the prey base for predatory birds in the area. The transmission lines would also increase the potential for collisions or electrocutions of raptors and other bird species.

The Proposed Action would result in the excavation of three (3) open pits, only one (1) of which would be backfilled with waste rock. The surface area of the open Singer Pit would be approximately 34 acres; the East Pit would remain as an approximately 227-acre excavation. Individual terrestrial wildlife species could become injured or killed by falls within these retained open pits. ~~In addition, wildlife species could be exposed to excessive predation levels should surface water accumulate in the bottom of the pits.~~ Should surface water accumulate in the bottom of the pits, wildlife species coming to

drink could be exposed to predators who may use the pit areas as a place to wait for prey.

The Project includes measures to prevent wildlife from entering process ponds, to minimize impacts from transmission lines, to discourage pit access by terrestrial species, to reduce the potential for the accumulation of surface water in the open pits, and to offset the reduced carrying capacity of the Project mine and process area to wildlife as a result of the net reduction of habitat as a consequence of the open pits (see Section 4.1.5.4). The effects of the Project on general wildlife species~~, except listed species and other species of concern which are discussed below,~~ would be below the level of significance. The effects of the Project on listed species and other special-interest species are specifically discussed below.

4.1.5.3.3. Impacts to Threatened or Endangered Wildlife Species

One species listed on both federal and California threatened species lists, the desert tortoise, would be directly impacted by the Project. A second wildlife species proposed for listing, the flat-tailed horned lizard, could also be subject to increased mortality or injury as a result of traffic to and from the Project area. No other listed or proposed species of wildlife were documented during site surveys or previously recorded in the Project area which would be impacted by the Project activities.

Desert tortoise: The habitats within the Project area are unclassified by the BLM with respect to desert tortoise, and the Project area has not been designated critical desert tortoise habitat by the USFWS (USFWS, 1994). However, as a result of field survey documentation of the tortoise within the Project area, the area is considered Category III tortoise habitat (BLM, 1989). The number of desert tortoise currently present within the Project area has been estimated from review of the site survey data to range between 33 and 57 individuals (Rado, 1996).

Desert tortoise which occupy the Project mine and process area may be injured or killed as a result of surface

disturbance during Project construction or processing activities. The surface modification activities would occur over approximately ~~1,400~~ 1,392 acres and would destroy the tortoise burrows or pallets within the area, potentially crushing or entombing individuals. Additional tortoises may also be injured or killed as a result of heavy equipment traffic within the Project mine and process area and from impacts with vehicles commuting to and from the Project area on existing roads. Tortoise occupying areas adjacent to the Project mine and process area, or having home ranges overlapping the Project area, would be similarly affected if they wander onto the active Project areas. A total of ~~1,139~~ 1,131 acres of desert tortoise habitat would be reclaimed following cessation of mining activities. Adjacent tortoise populations may slowly recolonize this area as vegetative processes establish native habitats. A total of 261 acres, comprising the East Pit and Singer Pit, would be lost as desert tortoise habitat after completion of Project reclamation.

Activities and facilities ancillary to the Project mine and process area could also adversely affect desert tortoises. Tortoises could be injured or killed as result of construction of the water pipeline or upgrading the electrical transmission line. The water pipeline would be buried, so it would not restrict tortoise movement. Construction or upgrade of the electrical transmission line may also attract, or provide perches for, tortoise predators (i.e., ravens). Storage ponds within the Project area or other sources of standing water and site refuse could also serve to attract and increase tortoise predator populations in the vicinity of the Project area. Following completion of mining activities, individual desert tortoises could wander into the East Pit or Singer Pit basins. While pit slopes (estimated at 50 degrees) may allow for the movement of animals, individual tortoises could become injured or killed as a result of falls or excessive predation from coyotes, kit foxes, or other species.

Desert tortoises within the Project area would also be subject to displacement either by capture and removal of individuals to locations outside the Project area, or by individuals within or near the Project area voluntarily leaving the vicinity when Project activities are initiated.

~~Prior to mitigation, the effects of the Project on desert tortoise would be considered significant. However, the Project includes design elements which would mitigate the impacts of the Project on the desert tortoise, and the BLM may require additional mitigation measures which would further reduce the impacts of the Project on the desert tortoise (see Section 4.1.5.4).~~ Some design elements have been incorporated into the Project to minimize the effects of the Project on desert tortoise. However, prior to mitigation, the effects of the Project on desert tortoise are considered significant. Mitigation measures are provided to further reduce the impacts of the Project on desert tortoise (see Section 4.1.5.4). The mitigated effects of the Project on desert tortoise would be below the level of significance.

Flat-tailed horned lizard: There were no flat-tailed horned lizards observed within the Project mine and process area during the biological surveys of the area, and no flat-tailed horned lizard habitat exists within the Project mine and process area or the Project ancillary area. There have been no recorded sightings of flat-tailed horned lizard within ten (10) miles of the Project area. However, there is a potential that a small number of flat-tailed horned lizards may be injured or killed as a result of Project-related traffic travelling along an approximately one-mile stretch of flat-tailed horned lizard habit located immediately north of the junction of Ogilby Road and Interstate Highway 8. While the effects of the Project on the flat-tailed horned lizard would be below the level of significance, mitigation measures to further reduce the impact of the Project on this species have been provided (see Section 4.1.5.4).

Peregrine falcon: No peregrine falcons were observed during surveys of the Project area, but a few falcons have previously been recorded from the Project area. Similarly, the species has been unreported in surveys for other projects in the general area (Condor, 1991; WESCO, 1992; Office of Arid Lands Studies, 1993; Western Resource Development, 1993; and DeDycker and Associates, 1994). Peregrine falcons are known to nest in cliff areas along portions of the Colorado River system (BOR, 1996). No potential nesting sites for peregrine falcons occur in the Project or surrounding area. The species could potentially utilize the area, including the Project mine and process area, for

foraging on an infrequent basis~~;~~ although, based on the absence of prior records, this seems highly unlikely. Project effects on the American peregrine falcon would not be significant.

Gila Woodpecker: A single gila woodpecker was observed perched on a large ironwood tree in a large wash near the southwest corner of the Project mine and process area by a biologist in January 1995 (Rado, 1995). Additional searches for this and other gila woodpeckers were subsequently conducted but did not record the bird in the Project area. The single observation of the Gila woodpecker is believed to have been of a transient bird. The gila woodpecker is a cavity nester known to prefer mature cottonwood and willow trees within riparian habitats not present in the Project area. The effects of the Project on the gila woodpecker would be below the level of significance.

4.1.5.3.4. Impacts to Other Wildlife Species of Concern

In addition to the listed species discussed above, the Project may adversely effect the following wildlife species of concern.

Cheeseweed owlfly: The cheeseweed owlfly has not been documented within the Project mine and process area. Since the Project occurs within the geographic range of this species, and because its host plant (creosote bush) is present, the cheeseweed owlfly could potentially occur here. If present, the cheeseweed owlfly would be subject to habitat loss associated with initial site blading and grading activities. Additionally, individual cheeseweed owlflies could be attracted to night lighting during operations; although, the species is considered a poor flyer (BOR, 1996). The geographic range of this species is extensive and collecting sites widely dispersed. The short flight season of adults and the indeterminate timing of adult emergence may reflect the paucity of records. The effects of the Project on the cheeseweed owlfly ~~would be below the level of significance~~ is unknown. The effects of the Project on the loss of potential cheeseweed owlfly habitat are considered below the level of significance and mitigation measures have been incorporated into the Project design to further reduce the long-term impacts of the Project on potential cheeseweed owlfly habitat.

<u>Chuckwalla</u>: Marginal quality chuckwalla habitat exists over approximately one-half of the Project mine and process area. A total of three (3) chuckwallas were observed during surveys of the Project area, and an estimated 25 individual chuckwallas may inhabit this area (Rado, 1995). Chuckwallas are known to display high site fidelity and would not be expected to flee the area as a result of site disturbance. As such, the chuckwallas present within the Project area could be killed or injured as a result of surface disturbance associated with mine construction and ore extraction and processing. Chuckwalla habitats are known to exist in the vicinity of Peter Kane Mountain north, Picacho Peak east, and the Cargo Muchacho Mountains south of the Project area. A large portion of the chuckwalla habitat exists within the Indian Pass and Picacho Peak Wilderness Areas. While the effects of the Project on the chuckwalla would be below the level of significance, measures have been incorporated into the Project design to further reduce the impacts of the Project on this species (see Section 4.1.5.4). Mitigation includes capture and relocation of chuckwallas in the Project mine and process area to suitable microhabit adjacent to the site. Given the low numbers of chuckwalla in the Project area, this measure should have no significant effect on the existing population of chuckwalla outside the Project mine and process area.

<u>Loggerhead shrike</u>: Loggerhead shrikes were frequently observed throughout the Project area during the biological surveys of the site (Rado, 199~~6~~5). Shrikes are common and widely distributed in the area. Two (2) family groups were observed within the Project area during the spring breeding period, suggesting a high likelihood that nesting occurs within the area, but no loggerhead shrike nests were encountered during the surveys. Based on a projected density of one loggerhead shrike per 50 acres, as was observed in the alluvial plain bordering the Santa Rosa Mountains, an estimated 33 shrikes may currently use the Project area for foraging and/or nesting. During site modifications and during construction and mining activities, approximately ~~1,400~~ 1,392 acres of shrike habitat would be impacted, displacing shrikes to neighboring unmodified lands. Individual loggerhead shrike nests may be destroyed, resulting in mortality to nestling birds or abandonment of eggs if site disturbance

occurs during the spring breeding period. Because of the availability of substantial offsite shrike habitat, the effects of the Project on the loggerhead shrike would be below the level of significance.

Black-tailed gnatcatcher: Black-tailed gnatcatchers were observed within the Project area during the biological surveys of the site. Favored gnatcatcher areas appeared to be in secondary drainages with wash vegetation in which young ironwood and palo verde trees provide cover (Rado, 1995). Gnatcatchers utilizing the Project mine and process area would be displaced to neighboring unmodified lands. Individual black-tailed gnatcatcher nests would be destroyed resulting in mortality to nestling birds or abandonment of eggs if site disturbance occurs during the breeding period. Because of the availability of suitable gnatcatcher habitat in neighboring areas, the effects of the Project on the black-tailed gnatcatcher would be below the level of significance.

Sharp-shinned hawk: A single sighting of a sharp-shinned hawk occurred in the Project area during the biological surveys of the Project area (Rado, 1995). This species is reported to be an uncommon winter migrant through the area. Implementation of the Project would result in a small reduction of the regional foraging habitat available to migrating sharp-shinned hawks, and it could result in a minor behavior modification of individual birds that cross the Project area. Based on the low frequency in which sharp-shinned hawks are projected to utilize the Project area, and the availability of offsite foraging habitat, the effects of the Project on the sharp-shinned hawk would be below the level of significance.

Northern harrier: Two (2) sightings of northern harriers were made within the Project area during the biological surveys (Rado, 1995). The sightings were during the fall and were attributed to isolated birds presumed to have been migrating through the area. There is no northern harrier nesting habitat within the Project area. The Project would result in a small reduction of the regional foraging habitat available to migrating northern harrier, and it could result in a minor behavior modification of individual birds that cross the Project area. Based on the low frequency in which northern harrier are

projected to utilize the Project area, and the availability of substantial offsite foraging habitat, the effects of the Project on the northern harrier would be below the level of significance.

LeConte's thrasher: LeConte's thrashers were not recorded during Project surveys, which included playing recorded bird calls during the breeding season in an attempt to elicit a response. However, prior records suggest that LeConte's thrashers may occur here (CNDDB, 1996; BLM records). If present, the species would be subject to habitat loss, displacement of individuals to offsite areas, and possible disruption of breeding and nest failure. Because of the availability of substantial offsite thrasher habitat, the effects of the Project would be below the level of significance.

Crissal thrasher: A single crissal thrasher was observed within the Project mine and process area during the surveys. The species is closely associated with drainages and wash "edge" vegetation. A total of about 100 acres of such habitats would be affected by Project actions. Crissal thrashers that utilize these drainages would likely be displaced into adjacent unmodified lands as a result of conversion of habitat. Depending upon timing of year, nests, may also be abandoned, resulting in mortality of nesting birds and/or abandonment of eggs. Because of the availability of substantial offsite crissal thrasher habitat, the effects of the Project would be below the level of significance.

Vaux's swift: Vaux's swifts utilize the general area, including the Project area, during spring and fall migration. They do not nest in this region. Site development may result in minor behavioral modification of migrating birds passing through the region. Mining activities would also result in a reduction of the available foraging/resting habitats for migrating birds. Because of the availability of substantial offsite swift foraging/resting habitats, the effects of the Project would be below the level of significance.

Golden eagle: Golden eagles were not observed during Project surveys. Eagle nesting sites are also absent from the Project area and vicinity. The species may utilize the general area, including the Project mine and process area, for foraging.

Project development would result in the incidental loss of ~~1,400~~ 1,392 acres of potential golden eagle foraging habitat. Based on the widespread availability of offsite foraging habitat for golden eagles, the effects of the Project on this species would be below the level of significance.

Prairie falcon: Site surveys did not document the occurrence of the prairie falcon. However, the prairie falcon has been previously recorded within the general area and could utilize the Project site and surrounding area for foraging (BLM records). Mining activities could result in the loss of ~~1,400~~ 1,392 acres of foraging habitat for prairie falcons. Based upon widespread availability of offsite foraging habitat, the effects of the Project on this species would be below the level of significance.

Cooper's hawk: Project site surveys did not document the occurrence of the Cooper's hawk. However, the species has been recorded as a seasonal visitor in the general area and could utilize the Project and surrounding area for foraging (BLM records). Mining activities could result in the loss of ~~1,400~~ 1,392 acres of foraging habitat for Cooper's hawk. Based on the widespread availability of offsite foraging habitats for Cooper's hawk, the effects of the Project on this species would be below the level of significance.

Long-eared owl: Project surveys did not document the occurrence of the long-eared owl. However, the species has been recorded as a seasonal visitor in the general area and could utilize the Project and surrounding area for foraging (BLM records). Based on the widespread availability of offsite foraging areas for long-eared owls, the effects of the Project on this species would be below the level of significance.

Barn owl: ~~The barn owl was not recorded during surveys of the Project area. Additionally, natural~~ Natural caves, fissures, old mine tunnels and shafts, or abandoned buildings often used for barn owl nesting are not present on within the Project area. Project development would potentially result in the creation of barn owl nesting within storage sheds, maintenance buildings, or other "open" structures. Since this species has been recorded in the general area (BLM records), Project development would result in the potential reduction of ~~1,400~~ 1,392 acres of barn

owl foraging habitat. Based on widespread availability of offsite foraging habitat for barn owls, the effects of the Project on this species would be below the level of significance.

~~Desert bighorn sheep: No bighorn sheep were observed within the Project area during the biological survey, and the Project area is not within bighorn habitat. Natural dispersal corridors, between Peter Kane Mountain to the north and the Cargo Muchacho Mountains to the south, lie several miles to the east of the Project mine and process area and would remain completely unaffected by the Project activities. The effects of the Project on bighorn sheep or bighorn sheep habitat would be below the level of significance.~~

Yuma puma: No pumas or sign were documented during surveys of the Project area. Use of the area by deer, a primary prey species for pumas, suggests that mountain lions may occur in the general area. Unconfirmed sightings of mountain lion in the region have been conveyed to the CDFG by hunters (Personal Communication - Rusty McBride, CDFG). Mining activities would result in the reduction of ~~1,400~~ 1,392 acres of foraging habitat potentially available to mountain lions. Associated impacts to deer could also incrementally affect the prey base for mountain lions. Based on the widespread availability of offsite foraging habitat for mountain lions, the effects of the Project on this species would be below the level of significance.

American badger: ~~One (1) American badger was observed about one mile north of the Project area boundary, and very limited badger sign were observed in the northeastern corner of the Project area during the biological surveys (Rado, 1995).~~ Badgers are presumed to utilize the Project area for foraging, but the actual number of badgers that may use the area is indeterminate. Previous studies of the species reported individual badgers having home ranges of 1,400 and 2,100 acres (Messick, 1987). Based on the area of these home ranges, few American badgers would be expected to ~~forage~~ occupy habitat within the Project area. The Project would result in a reduction of the habitat available to badgers ~~foraging~~ in the Project area, and increased noise, lighting, and traffic would likely result in behavior modifications by badgers to avoid the area. Based on

the ~~limited number of badgers which may forage in the area, and the~~ availability of offsite foraging habitat, the effects of the Project on the American badger would be below the level of significance.

Sensitive bat species: No ~~sensitive bat species were recorded during the biological surveys of the Project area, and no~~ sensitive bat species have previously been recorded on the site (Rado, 1995). No mine adits, caves, or large rock crevices exist in the Project area, thereby limiting the species of bats which may day roost on the site. However, some bat species could roost in trees or in small rock crevices. A supplemental focused assessment of the findings of the biological surveys with respect to bats was conducted by Patricia E. Brown, Ph.D. (see Appendix H). Dr. Brown concluded that five (5) sensitive bat species designated by the USFWS as Special Status Species and/or California species of concern (CSC) could conceivably roost and/or forage in the Project area, including: Yuma myotis, small-footed myotis, cave myotis, occult ~~myotis~~ little brown bat, and desert pallid bat. A larger number of additional Special Status Species/CSC bat species which would not roost in the Project area could use the Project area as nighttime foraging habitat, including: Townsend's big-eared bat, spotted bat, western mastiff, and California leaf-nosed bat.

Large numbers of bats would neither be killed nor displaced by the Project~~, but construction and surface disturbance would eliminate any potential bat roosting sites within the Project mine and process area~~. Foraging habitat would ~~also~~ be affected, but similar habitat is widespread around the Project area. Night lighting from the Project would attract insects and could result in a net increase in bats foraging in the vicinity of the Project area. This could lead to individual bat collisions with lights or drownings in ponds. However, based on the availability of offsite day roost areas and foraging habitat, the effects of the Project on sensitive bat species would be below the level of significance.

~~Deer~~Mule deer: Desert deer are widely distributed throughout

the Project area and surrounding area, but the deer population is reported to be low (Celentano and Garcia, 1984). Deer were observed to use the northeast-southwest trending wash channels as potential movement corridors and to also move cross-gradient over the upland areas and across the washes in the Project area toward the CDFG-maintained "guzzler" off of Hyduke Road south of the Project area (Personal Communication - T. Rado).

The Proposed Action would impact deer, ~~and would~~ eliminate the use of the Project mine and process area by deer over the life of the Project, and would permanently eliminate the majority of the open pits from deer habitat. Without appropriate mitigation, Project-related impacts could result in lowered area carrying capacity and a slight net reduction in the numbers of deer that seasonally utilize the area, and/or that may reside in the area due to the availability of water in maintained guzzlers located south and also east of the Project mine and process area. Potential impacts to deer would include:

- The general loss of most of the Project mine and process area as foraging habitat, in particular, the approximately 100 acres of microphyll woodland habitat which would be destroyed during Project construction.

- To the extent the Project mine and process area serves as deer fawning habitat, the approximately 100 acres of microphyll woodland in the washes would be destroyed as potential fawning habitat during Project construction.

- Restricted access through the Project mine and process area as a result of fencing may limit deer movement in the vicinity of the Project mine and process area, and access routes to three (3) big game guzzlers located east and south of the Project mine and process area boundaries would be slightly reduced.

- Noise from equipment operation, blasting activities, and human presence, as well as night lighting of the Project mine and process area facilities, would be expected to inhibit deer activity in the immediate vicinity of the Project area.

- Vehicles commuting on roads to the Project mine and process area would increase the potential for vehicle impacts with deer and resulting injuries and mortality.

- Deer which penetrate the perimeter fence and/or interior barriers of the Project mine and process area would be subject to an increased potential for vehicle impact injuries and mortality and ingestion of potentially harmful process pond solutions or other chemicals stored and used on the site.

- Water could accumulate in the East Pit and attract deer to the new water source. Limited access to and from the pit could potentially serve as an opportunity for increased predation of deer.

Because of the low density and scattered distribution of deer in the area, the Project would not be expected to directly impact a large number of deer, but deer would be indirectly impacted by reduction of habitat quality through vegetation removal. The effects of the Project on deer would be below the level of significance. However, mitigation measures have been designed into the Project and are proposed which would further reduce the impact of the Project on microphyll woodland habitat and deer and other wildlife species which utilize the habitat (see Section 4.1.5.4). Elements of the Project design which would mitigate impacts on deer include:

- Constructing a 6-foot high, barbed-wire topped, chainlink fence around all Project created surface water sources within the Project mine and process area, including the heap leach pad, process facilities, and fresh water pond;

- Revegetating disturbed areas following mining activities, and including native deer forage plants as a part of this effort (subject to BLM and CDFG approval);

- Performing revegetation within the permanent diversion channels, including planting of young seedling palo verde and ironwood;

- Performing revegetation on selected adjacent drainages subject to historic damage unrelated to the Project;

- Diverting surface drainage back into the same major channels to maintain continuity of flow and water quality to habitat downstream of the Project mine and process area;

- Constructing a rock barrier around the remnant Singer Pit and East Pit;

- Constructing an offsite big game guzzler at a location in the vicinity of the Project area mutually agreeable to Chemgold, the CDFG and the BLM; and

- Constructing one or more on-site big game or small game guzzlers at the conclusion of site reclamation.

Desert bighorn sheep: No bighorn sheep were observed within the Project area during the biological survey, and the Project area is not within bighorn habitat. Natural dispersal corridors, between Peter Kane Mountain to the north and the Cargo Muchacho Mountains to the south, lie several miles to the east of the Project mine and process area and would remain completely unaffected by the Project activities. ~~The effects of the Project on bighorn sheep or bighorn sheep habitat would be below the level of significance.~~ No effects to desert bighorn sheep should occur as a result of the Project.

4.1.5.4. Mitigation Measures

Incorporated by Project Design:

- *The following measures have been incorporated into the Project design to reduce the general impacts to biological resources during the active life of the Project.*

  - 4.1.5-1: Applicant shall construct a fence ~~no less than four (4) feet in height~~ around the entire Project mine and process area. The fence shall be constructed no less than four (4) feet in height with 3-strands of smooth wire, or equivalent~~, and shall include tortoise exclusion fencing, in conformance with responsible agency requirements, to inhibit wildlife access to Project facilities~~. That portion of the perimeter fence constructed along the western boundary of the Project mine and process area, including all of the fenceline adjacent to Indian Pass Road (see Figure 2-2), shall be a chain-link fence, no less than six (6) feet in height, to restrict public access to the Project area. The entire perimeter fence shall include desert tortoise exclusion fencing, in conformance with responsible agency requirements, to inhibit wildlife access to Project facilities (see also Mitigation Measure ~~4.1.5-40~~ 4.1.5-38). Applicant shall ~~also~~ construct ~~an interior~~ a chain-link fence, no less than six (6) feet in height, with one (1) foot of barbed wire at the top, around the ore leach pad, process facilities, and fresh water pond to further restrict wildlife from accessing these facilities. Applicant shall routinely inspect and repair the fences, as necessary.

  - 4.1.5-2: Applicant shall prohibit cross-country use of vehicles and equipment except within those portions of the mine and process area subject to surface disturbance.

  - 4.1.5-3: Applicant shall cover the pregnant and barren solution ponds with either small-mesh nets; a solid, 40-mil, HDPE/polypropylene cover; floating plastic balls; or equivalent cover acceptable to the BLM to keep wildlife out of the ponds. Applicant shall maintain the cover over the life of the Project. Applicant shall keep records of all wildlife kills which may be associated with the use of cyanide by the project, including all

dead wildlife found in or adjacent to the ponds or heap. Observations of wildlife killed in the ponds or on the heap shall be reported to the BLM, CDFG, and the U.S. Fish and Wildlife Service (USFWS) ~~quarterly~~ monthly for evaluation and, if determined necessary, for possible imposition of additional mitigation requirements (see also Mitigation Measure 4.1.5-34).

- 4.1.5-4: Applicant shall advise Project employees, contractors, and visitors of the need to adhere to speed limits and to avoid any animals, including the desert tortoise, flat-tailed horned lizard, and deer which may be encountered on or crossing the road to and from the Project area.

- 4.1.5-5: Prior to completion of mining, Applicant shall conduct an assessment of the potential for a pit lake to form in the East Pit. If the assessment indicates a reasonable potential for a pit lake to form, Applicant shall backfill the East Pit to an elevation which would raise the floor of the pit to an elevation higher than the level of any pit lake which may be predicted to form from the inflow of ground water and, thereby, prevent the creation of an attractive nuisance for wildlife. The findings of the pit lake assessment shall be completed and submitted for approval by the BLM prior to the completion of mining activities.

- 4.1.5-6: Upon completion of mining activities, either a loose rock rubble barricade comprised of large boulders or other suitable material~~, or an alternative method acceptable to the BLM,~~ shall be constructed to prevent vehicular access and limit pedestrian access to the exposed open pit(s) by the public and terrestrial wildlife species. The proposed design for the barricade shall be completed and submitted for approval by the BLM and ICPBD prior to the completion of mining activities.

- *The following additional measures have been incorporated into the Project design to reduce the impacts on microphyll woodland habitat and associated wildlife which utilize this habitat.*

- 4.1.5-7: Applicant shall construct a fence~~ generally equivalent to the Project perimeter fence entirely~~, no less than four (4) feet in height with 3-strands of smooth wire, or equivalent, around the approximately 40-acre south-central portion of the central wash within the Project mine and process area which is not

intended to be disturbed by Project operations to prevent accidental surface disturbance of the microphyll woodland habitat in this internal area during mine construction and operation.

- 4.1.5-8: Applicant shall provide periodic drip irrigation over the life of the Project to enhance the establishment of ironwood and deer browse vegetation within the surface drainage identified by Mitigation Measure 4.1.5-7~~, as may be appropriate, to enhance the quality of microphyll woodland habitat in this drainage~~. Vegetation selected for enhanced deer browse establishment shall be comprised of species known to occur in the Project area. The composition of the seed mix and the design of the vegetation enhancement measures shall be submitted to the BLM for approval prior to implementation.

- 4.1.5-9: Applicant shall construct a big game guzzler in a design and location acceptable to the BLM and the CDFG in the general vicinity of the Project mine and process area to ~~mitigate the loss of~~ provide for more intensive use of the existing habitat ~~for~~ by deer and other wildlife. Applicant shall obtain the required permit from the BLM prior to guzzler construction.

- 4.1.5-10: Applicant shall provide periodic drip irrigation over the life of the Project to enhance the establishment of ironwood and deer browse vegetation along the western slopes and banks of the approximately 3,000-foot section of the existing ephemeral stream channel immediately adjacent to, but outside of, the east-southeast boundary of the Project mine and process area~~ as may be appropriate to enhance the quality of existing microphyll vegetation and available deer browse on this area of this channel~~. Vegetation selected for enhanced deer browse establishment shall be comprised of species known to occur in the Project area. The composition of the seed mix and the design of the vegetation enhancement measures shall be submitted to the BLM for approval prior to implementation.

- 4.1.5-11: Applicant shall conduct annual transect surveys of the major through-going ephemeral stream channels upstream and downstream of the Project mine and process area to monitor these drainages with respect to existing vegetation and microphyll woodland habitat and document any potentially

adverse erosional or depositional processes. The surveys shall also document any sightings of deer fawn, bighorn sheep~~and any~~, mountain lion, or other species for which monitoring is specified by the BLM. An annual report of the transect surveys shall be prepared and submitted in an acceptable form to the BLM.

- 4.1.5-12: Applicant shall construct all stream channel diversions to divert flows back into the same major wash system and ensure the continuing flow of an equivalent pre- and post-Project quantity and quality of water through the major drainages to preserve the downstream microphyll woodland habitat within the drainages (see also Mitigation Measure ~~4.1.5-34~~4.1.5-33 and mitigation measures provided for surface hydrology [Section 4.1.3.1.3]). ~~Upon the completion of the backfilling of the West Pit, Applicant shall replace the diverted section of the major western stream channel to its approximate original location within the Project mine and process area.~~

- 4.1.5-13: Applicant shall implement the ~~site~~ Project Reclamation Plan in conformance with the requirements of the BLM and Imperial County. The Reclamation Plan shall include a program for revegetation of the permanent diversion channels, including the planting of seedlings ~~or~~ of young ironwood and palo verde and seeding of other microphyll vegetation typical of the pre-Project wash habitat (see also Mitigation Measure 4.1.5-17).

- 4.1.5-14 Applicant shall, as a part of final reclamation, construct one or more big game and/or small game guzzlers within the Project mine and process area in a design and location acceptable to the BLM and the CDFG to enhance the restored site as habitat for deer and other wildlife. Applicant shall obtain the required permit from the BLM prior to guzzler construction.

- 4.1.5-15 Applicant shall enter into a Stream Alteration Agreement with the California Department of Fish and Game (CDFG) as may be required pursuant to California Fish and Game Code Section 1603~~(see also Mitigation Measure 4.1.5-?)~~. The agreement shall include those measures which CDFG and

Applicant agree may be necessary, or appropriate, to mitigate, and compensate for, the impacts of the Project on the stream channels and associated microphyll woodland habitat and wildlife. Measures which may be included in the Stream Alteration Agreement include:

(1) Applicant shall acquire title to offsite private lands with comparable microphyll woodland habitat, in a location acceptable to the CDFG and the Applicant, to compensate at a 1:1 ratio for microphyll woodland destroyed and not reclaimed as a result of the Project. Ownership of the acquired land shall be transferred to the CDFG for long term habitat management.

(2) Applicant shall construct and/or maintain over the life of the Project one or more additional big game and/or small game guzzlers in a design and location acceptable to the CDFG, Applicant, and BLM, as appropriate, to enhance the habitat for deer and other wildlife.

(3) Applicant shall perform reclamation activities on one or more offsite locations on land in the vicinity of the Project acceptable to CDFG, Applicant, and the BLM, as appropriate, to restore microphyll woodland habitat which has been adversely impacted by previous actions unrelated to the Project.

(4) Applicant shall either fund or conduct additional biological investigation(s) as may be acceptable to the CDFG and Applicant to develop additional data for future agency decisions reflecting the biological resources associated with stream channels in the general vicinity of the Project.

- *The following measures have been incorporated into the Project design to reduce the long-term impacts of the Project and to enhance site reclamation.*

  - 4.1.5-16: Upon completion of mining activities, Applicant shall remove all equipment and materials from the Project area. All diversion channel lining materials and rip rap shall be removed from the temporary diversion channels.

- 4.1.5-17: The ~~site~~ Project Reclamation Plan shall include the collection of both fairy duster seeds and winged ~~forget-me-not~~ cryptantha seeds and distribution of the collected seeds of both species within appropriate microhabitats within the Project mine and process area.

- 4.1.5-18: Applicant shall stockpile available soil from the wash channels to be disturbed within the Project mine and process area and store the soil for subsequent use during site reclamation activities.

- 4.1.5-19: Applicant shall salvage specimens of selected plant species from the Project mine and process area prior to construction to be utilized during Project reclamation, habitat enhancement activities, or other site reclamation needs. Plant species may include cactus, ocotillo, ironwood, palo verde, or other appropriate species identified by the BLM.

- 4.1.5-20: Applicant shall implement ~~a weed abatement program over the life of the Project for control of salt cedars (*Tamarisk sp.*) and other potentially noxious weeds that may invade the site. The weed abatement program shall include ordinary practices such as seasonal grubbing and the application of herbicides, as necessary.~~ weed control measures such that all introduced plants (e.g., salt cedar (*tamarisk species*), mustard, and other noxious weeds) will not become established within the Project area. Manual or mechanical means of control will be the preferred methods employed. Use of other methods (e.g., herbicides) will require approval by the BLM. The weed control measures shall be implemented when noxious weeds are visually identified on the site and shall continue over the life of the Project.

- 4.1.5-21: Applicant shall implement the revegetation program contained in the ~~site~~ Project Reclamation Plan approved by the BLM and Imperial County. The revegetation program shall include a test plot program, surface contouring and shaping, salvage and distribution of stockpiled soils, collection of a seedbank of seeds from within and in the vicinity of the Project area, preparation of seedbeds, seeding with approved mixtures of native plant species endemic to the area, planting of the plants salvaged from the area prior to mine construction,

monitoring for invasion of noxious weeds or salt cedar, and vegetation success monitoring.

- 4.1.5-22: Applicant shall integrate the revegetation program activities with other site stabilization and restoration activities required by the approved ~~site~~ Reclamation Plan (see also Mitigation Measures 4.1.5-12 and 4.1.5-13).

Incorporated by Regulation:

- 4.1.5-23: Applicant shall comply with ~~the applicable provisions of the Federal Endangered Species Act of 1973, California Endangered Species Act of 1984, Native Plant Protection Act of 1977, Migratory Bird Treaty Act, and the Bald Eagle Protection Act.~~ all of the terms and conditions of the Biological Opinion prepared for the Project by the U.S. Fish and Wildlife Service in response to the BLM request for formal consultation pursuant to Section 7 of the Endangered Species Act of 1973, as amended.

- 4.1.5-24: Project actions may also require a dredge and fill permit (404 permit) from the U.S. Army Corps of Engineers (ACOE). A permit is required in the event that proposed activities would entail the dredging or filling of materials into designated waters of the United States. The ACOE shall be contacted by Applicant to determine whether such a permit shall be required prior to the onset of any actions that would disturb site drainages.

- 4.1.5-25: The California Regional Water Quality Control Board, Colorado River Basin Region (CRWQCB) shall be notified by the Applicant of Project actions, and Applicant shall comply with CRWQCB requirements for obtaining Waste Discharge Requirements for proposed discharges to land and a general Storm Water Permit.

Incorporated to Avoid Potentially Significant Effects:

- *The following measures were identified in the Biological Assessment to mitigate the effects of the Project on biological resources (Rado, 1996). Each of these measures would be required by the BLM:*

General Measures to Protect All Species of Concern:

- 4.1.5-26: Applicant shall designate a field contact representative (FCR) who will be responsible for overseeing compliance with protective stipulations for listed species. The FCR shall have authority to halt all activities that are in violation of the stipulations. The FCR shall have a copy of all appropriate stipulations when work is being conducted at the site. The FCR may be a project manager, company environmental coordinator, contract biologist, or ~~a person designated by the agencies.~~ other person identified as responsible by the Applicant. Applicant shall provide the name and contact information of the FCR to the BLM and applicable responsible agencies prior to site construction.

- 4.1.5-27: Prior to the onset of surface disturbance activities by the Project, Applicant shall retain qualified biologist(s) acceptable to the BLM and the CDFG to inspect the Project mine and process area and capture and relocate any chuckwallas encountered to suitable microhabit (e.g., rock rubble, rock outcrop ~~and~~, exfoliating cracks or crevice areas) in the shortest distance possible between the outside of the Project mine and process area perimeter fence (not to exceed 1,000 feet) and the point of capture ~~within 1,000 feet outside of the Project mine and process area perimeter fence~~.

- 4.1.5-28: During mining activities, stockpiling of equipment and vehicles shall utilize those portions of the Project area that will be subject to permanent disturbance. Temporary or inadvertent disturbance to remaining portions of the area should be minimized by: staking, "flagging", or otherwise clearly marking the boundaries of the alignment; notifying employees of the specific areas, boundaries of the areas, and the need to avoid disturbance to remaining areas; and posting signs or erecting temporary fencing at access points to limit access to authorized vehicles and equipment only.

All employees shall be instructed that their activities shall be confined to locations within flagged or otherwise marked areas.

The area of disturbance shall be confined to the smallest practical area, considering extent and location of ore bodies, topography, placement of facilities and access roads, locations of sensitive species, public health and safety, and other limiting factors. To the extent practical, previously disturbed areas within the Project ~~site~~ mine and process area shall be used for the placement of equipment, work staging sites, or parking of vehicles.

- 4.1.5-29: Open pipeline trenches, test holes, or test trenches shall be regularly inspected by the ~~staff environmental coordinator or a contract biologist at~~ FCR, or qualified biologist acceptable to the BLM, a minimum of three (3) times per day. During excavation of trenches or holes, escape ramps consisting of loose earth deposited in the test hole or trench shall be placed to facilitate the escape of any wildlife species that may inadvertently become entrapped. Any animals discovered shall either be allowed to escape before activities resume or carefully removed from the pit or trench and allowed to escape. A final inspection of the open trench segment or hole shall also be made by ~~a qualified biologist~~ the FCR, or qualified biologist acceptable to the BLM, immediately prior to backfilling. Arrangements shall be made prior to the onset of maintenance or construction to ensure that listed wildlife species can be removed from the trench without violating any requirements of the federal or California Occupational Safety and Health Administration.

- ~~4.1.5-30: To prevent the creation of on-site colonies of California leaf-nosed bats or other sensitive bat species during active mining operations, and as a means of reducing the site "attractiveness" as a roosting area for these species, Applicant shall screen the openings of any shafts or tunnels constructed on the site during mining operations.~~

- ~~4.1.5-31:~~ 4.1.5-30: Toxic materials contained on the site shall be stored and used in a manner that prevents harm to desert tortoises and other wildlife species. Methods of containment will be approved by the BLM.

- ~~4.1.5-32:~~4.1.5-31: Nets or other suitable coverings shall be placed over all ponds containing toxic solutions to prevent contact by area wildlife species, including bats. These coverings shall be regularly inspected and maintained by Applicant for the duration of the Project. Methods of cover, inspection, and maintenance will be approved by the BLM.

- ~~4.1.5-33:~~4.1.5-32: Transmission pole design shall prevent any potential for the inadvertent electrocution of raptors (see also Mitigation Measure ~~4.1.5-45~~4.1.5-43). Transmission pole design will be approved by the BLM.

- ~~4.1.5-34:~~4.1.5-33: Project actions will require the realignment of sections of washes. Applicant shall develop a specific plan for agency approval that ensures maintenance of intermittent flood water flow down these realigned wash channels into unmodified drainage boundaries outside of the Project in order to preserve vegetation and wildlife habitat. Design of these sections of realigned wash shall also include appropriate dimensions and slopes to accommodate continued use by wildlife during mining operations and to facilitate revegetation. A specific plan shall be prepared by Applicant and submitted to the BLM for review prior to the onset of any activities that would result in disturbance to these drainages. Plan design shall include the vegetation of channel bypasses on the site with native species that include ironwood and palo verde in order to maintain continuity of washes, restoration and revegetation of drainages during site reclamation, and planting of ironwoods and palo verde in offsite drainages to enhance wildlife habitat. Any rip rap initially placed along drainages during mining activities shall be removed at the conclusion of mining operations during on-site reclamation.

Desert Tortoise Protection Measures:

- ~~4.1.5-35:~~4.1.5-34: Project employees involved with regular activities shall be required to take a threatened and endangered species education program. The program shall include information on the biology of listed and sensitive species and their occurrence in the Project area, measures being implemented for the protection of ~~this species~~ desert tortoise and

its habitats during Project activities~~;~~ and means by which individual employees can facilitate this process.

A program approved by BLM shall be employed. Wallet-size cards signifying completion of training shall be recommended to employees. All employees shall participate in the education program prior to commencing Project activities. New employees shall receive formal approved training prior to working on-site. The program shall typically last from between 30 minutes and one (1) hour and shall cover the following topics at a minimum:

- Distribution;
- General behavior and ecology;
- Sensitivity to human activities;
- Legal protection;
- Penalties for violation of State and federal laws;
- Reporting requirements; and
- Project mitigation measures.

► ~~4.1.5-36:~~4.1.5-35 Incidences of observations of desert tortoises and their sign during activities shall be conveyed to the ~~Project field supervisor~~ FCR during mining actions. Employees shall be notified that they are not authorized to handle or otherwise move any desert tortoises encountered.

► ~~4.1.5-37:~~4.1.5-36: Tortoises commonly seek shade during the hot portions of the day. During mine project activities, employees shall be required to check under equipment and vehicles prior to moving such. If tortoises are encountered, the vehicle shall not be moved until such animals have voluntarily moved to a safe distance away from the parked vehicle.

~~► 4.1.5-38: Mining employees shall exercise caution when commuting to the Project area. Speed limits shall be limited to the speed designated by the Imperial County Road Department to minimize the chance for the inadvertent injury or mortality to desert tortoises or other wildlife species encountered on the road. Subject to County approval and BLM concurrence, Applicant shall post speed limit signs along Indian Pass Road.~~

- ~~4.1.5-39:~~4.1.5-37: If desert tortoises must be moved from harm's way during any Project activities, the following procedures shall be implemented by persons authorized by the USFWS to handle desert tortoises:

    (1) Desert tortoises shall be handled only by an authorized tortoise handler and only when necessary. New latex gloves shall be used when handling each desert tortoise to avoid the transfer of infectious diseases between animals. Desert tortoises shall be moved the minimum distance possible within appropriate habitat to ensure their safety. In general, desert tortoises shall not be moved in excess of 1,000 feet for adults and 300 feet for hatchlings. An authorized tortoise handler should follow the general handling methods contained in the "Protocols for Handling Live Tortoises" (~~Arizona Game and Fish, *et al*, 1991~~USFWS, 1990).

    (2) Desert tortoises that are found above ground and need to be moved from harm's way shall be placed in the shade of a shrub. All desert tortoises removed from burrows shall be placed in an unoccupied burrow of approximately the same size as the one from which it was removed. All excavation of desert tortoise burrows shall be done using hand tools, either by or under the direct supervision of an authorized tortoise handler. If an existing burrow is unavailable, an authorized tortoise handler shall construct or direct the construction of a burrow of similar shape, size, depth, and orientation as the original burrow. Desert tortoises moved during inactive periods shall be monitored for at least two days after placement in the new burrows to ensure their safety. An authorized tortoise handler shall be allowed some judgement and discretion to ensure that survival of the desert tortoise is likely.

    (3) If desert tortoises need to be moved at a time of the day when ambient temperatures could harm them (less than 40 degrees F or greater than 90 degrees F), they shall be held overnight in a clean cardboard box. These desert tortoises should be kept in the care of an authorized tortoise handler under appropriate controlled

temperatures and released the following day when temperatures are favorable. All cardboard boxes shall be appropriately discarded after one use.

(4) All desert tortoises moved from harm's way shall be marked for future identification. An identification number using the acrylic paint/epoxy covering technique should be placed on the fourth costal scute (USFWS, 1990). No notching should be authorized.

To facilitate clearing the area of desert tortoises, excavation of burrows should begin no more than fourteen (14) days prior to the onset of surface disturbing activities, as long as a final survey is conducted within 24 hours of the onset of activities to ensure that desert tortoises have not returned to the work area.

- ~~4.1.5-40:~~4.1.5-38: In order to minimize any exposure risk to desert tortoises, a specially designed fence shall be constructed around all portions of the Project area containing pits, ponds, waste rock stockpiles, ore processing areas, maintenance areas, and surface facilities. ~~Fence~~ The final fence design shall be discussed with and found acceptable to the USFWS, BLM, and CDFG. The desert tortoise exclusion fence must meet the following preliminary design specifications:

  (1) Fencing shall result in a non-breachable barrier, and its support structure may be comprised of a variety of materials;

  (2) Galvanized ¼- to ½-inch diameter mesh and 36-inch wide hardware cloth shall be used; and

  (3) The hardware cloth shall be buried 12 inches underground, extend at least 24 inches above the ground, and be firmly attached to the bottom of the perimeter fence and other wildlife exclusion fences.

- ~~4.1.5-41:~~4.1.5-39: Following fence installation, and prior to initiation of mining, authorized biologists shall conduct a complete (i.e., 100%) survey for desert tortoises within the fenced area. All tortoises found shall be marked and removed

from the fenced mine area for safe offsite release within 1,000 feet of the outside of the Project fence using protocols acceptable to the BLM, USFWS, and the CDFG.

- ~~4.1.5-42:~~4.1.5-40: At the conclusion of Project pre-activity surveys and the relocation of any desert tortoises outside of the Project fence, Applicant and an authorized tortoise handler shall prepare a summary report documenting the desert tortoise protection measures implemented. The summary report shall be submitted to the BLM.

- ~~4.1.5-43:~~4.1.5-41: Pipeline placement design outside of tortoise-proof fenced project boundaries shall allow for the unimpeded movement of tortoises and other small terrestrial wildlife species.

- ~~4.1.5-44:~~4.1.5-42: That portion of the transmission line corridor extending outside of the fenced Project mine and process area boundary shall be re-surveyed for desert tortoise burrows and pallets within fourteen (14) days preceding line upgrading/construction. Tortoise burrows and pallets encountered within the construction zone (if any) shall be conspicuously flagged by the surveying biologist(s) and avoided during power pole placement or existing line upgrading. Contingent upon the findings of the pre-survey for the transmission line upgrade/construction, a determination will be made by the BLM as to whether or not on-site desert tortoise monitoring will be required during the transmission line upgrade/construction activities.

- ~~4.1.5-45:~~4.1.5-43: Transmission pole design shall prevent any nesting or perching by ravens, a major predator of young desert tortoises (see also Mitigation Measure ~~4.1.5-33~~4.1.5-32).

- ~~4.1.5-46:~~4.1.5-44: Notification signs for the desert tortoise and speed limit signs shall be placed and maintained within the Project boundary by Applicant to reduce chances for inadvertent vehicle-induced injury or mortality to desert tortoises and other wildlife species. Applicant, with concurrence of County, shall also place these signs along Indian Pass Road leading to the Project mine and process area.

- ~~4.1.5-47:~~4.1.5-45: Applicant shall participate in the BLM desert tortoise program for acquiring offsetting lands in compensation for adverse modification of desert tortoise habitat. Under the BLM policy undesignated lands such as the Project area, where tortoises or tortoise sign are located, become Class III tortoise habitat. Within Class III habitat, an offsetting ratio of 1:1 (e.g., one (1) acre of land secured and protectively managed for each acre affected) is applied. Prior to the Record of Decision, Applicant shall determine the feasibility of acquiring 200 acres of suitable desert tortoise habitat which is also microphyll woodland habitat. This 200 acres of desert tortoise/microphyll woodland habitat should be in a location, and of a quality, acceptable to the BLM to concurrently provide mitigation for the loss of desert tortoise and microphyll woodland habitat from the Project area.

- *Other measures:*

  - ~~4.1.5-48:~~4.1.5-46: Trash and food items shall be contained in closed containers ~~and removed regularly from the mining site in order~~ to reduce attractiveness to opportunistic predators such as ravens, coyotes, and kit foxes.

  - ~~4.1.5-49:~~4.1.5-47: Firearms and pet dogs shall be prohibited from the mine site.

- *Monitoring:*

  In addition to the preceding mitigation measures for biological resources, the NEPA and CEQA Lead Agencies (BLM and ICPBD, respectively) will prepare and adopt a biological monitoring program as part of the mitigation monitoring plans required under the regulations implementing NEPA and CEQA (see Section 1.3.1 and Section 1.3.2, respectively). The mitigation monitoring plans will document what will be required for:

  (1) Compliance monitoring, to ensure Project compliance with mitigation measures adopted from the EIS/EIR or other sources into the respective agency decision documents. They may also contain requirements to implement;

(2) Effectiveness or success monitoring, to determine if mitigation measures required in the decision documents are achieving the intended environmental objectives; or

(3) Validity monitoring, to determine if required mitigation measures continue to be correct or of the appropriate level over time.

The biological monitoring program will be developed by the BLM and ICPBD in consultation with the Applicant, the USFWS, and the CDFG, and will be approved by the Lead Agencies as part of any respective decision to approve the Project.

4.1.5.5. Unavoidable Adverse Effects and Level of Significance After Mitigation

The Proposed Action would result in the unavoidable loss of approximately 100 acres of tree/shrub vegetation (desert wash microphyll woodland habitat) and approximately ~~1,300~~ 1,292 acres of shrub/scrub vegetation (desert succulent scrub habitat) over the life of the Project. A total of ~~1,139~~ 1,131 acres of this area would be subject to reclamation measures at the end of the Project life to restore wildlife habitat, but approximately 261 acres comprising the remnant East Pit and Singer Pit would be barricaded to prevent entry by terrestrial species. A total of 50 acres of microphyll woodland habitat would be lost and not restored at the completion of reclamation. The Proposed Action would also result in the unavoidable "incidental take" of an estimated 33 to 57 desert tortoises (a federal- and state-listed threatened species) currently occupying the Project area, principally through harassment and some through direct mortality. Other resident and non-resident wildlife species dependent on the habitat in the Project mine and process area would also be subject to displacement and ~~potential~~ increased mortality.

Measures are provided to mitigate the effects of the Project on vegetation, wildlife, and habitat. The mitigated effects of the Proposed Action on biological resources are below the levels of significance.

4.1.6. Cultural and Paleontological Resources

This section is based in part on the July, 1996 and September, 1996 cultural resource reports prepared for the Project area (ASM Affiliates, Inc., 1996a; ASM Affiliates, Inc., 1996b), the non-confidential portions of which ~~is~~ are provided as Appendix J-1 and Appendix J-2 of this EIS/EIR.

4.1.6.1. Assumptions and Assessment Guidelines

The Proposed Action would normally have a significant effect on the environment if it would:

- Disrupt or adversely affect a prehistoric or historic archeological site or a property of historic or cultural significance to a community or ethnic or social group; or a paleontological site except as a part of a scientific study; or
- Adversely affect cultural resources determined to be eligible or potentially eligible for the National Register of Historic Places.

Implementation of the Proposed Action would require local and state agencies to demonstrate compliance with CEQA, for which specific guidance regarding cultural resources is presented in Appendix J of the CEQA Guidelines. Federal agencies must demonstrate compliance with the National Historic Preservation Act (Public Law 89-665); 80 Stat 915; 16 U.S.C. 470; as amended) [NHPA], which requires actions similar to CEQA for the protection of significant cultural resources. Because Project activities would disturb only public lands managed by the BLM, the federal process would take precedence.

Section 106 of NHPA requires a federal agency with jurisdiction over a project to evaluate the effect of the proposed project on properties included on, or eligible for, the National Register of Historic Places (NRHP). Federal agencies must also provide the Advisory Council on Historic Preservation (ACHP) an opportunity to comment on the effects of the proposed project to these properties. The 1992 amendments to the law particularly strengthened Native American involvement in the process. Specific guidance for these actions are found in federal regulations at 36 CFR Part 800, and in the programmatic agreement between BLM, ACHP, and the California State Historic Preservation Officer (SHPO).

The first step in the process required under Section 106 is to identify the cultural resources within the project's "area of potential effect" (APE), which has already been completed through the Project area cultural resources inventory (see Section 3.6.2.3). Next, based in part upon information provided in the inventory report and the criteria found at 36 CFR Part 60.4, the BLM, in consultation with the SHPO, must evaluate each of the identified cultural resources and determine its eligibility for the National Register of Historic Places (NRHP). The criteria for determining the NRHP-eligibility of a cultural resource are as follows:

> "The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling and association and:
>
> "A. That are associated with events that have made a significant contribution to the broad patterns of our history; or
>
> "B. That are associated with the lives of persons significant in our past; or
>
> "C. That embody the distinctive characteristics or a type, period, method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
>
> "D. That have yielded, or may likely to yield, information important in prehistory or history."

No further action would be required under the Section 106 process for cultural resource sites determined not eligible for the NRHP. For cultural resources determined eligible for the NRHP, BLM, again in consultation with SHPO, must apply the Criteria of Effect [36 CFR 800.9(a)] to determine if eligible resources would be affected by implementation of the Proposed Action. If BLM determines that the Project will have no effect and SHPO concurs, then no further action is required under Section 106. If BLM determines that the Project will have an effect, then BLM must apply the Criteria

of Adverse Effect (36 CFR 800.9(b)). BLM could determine that the effect is not adverse to the NRHP-values of each site found eligible for the NRHP, and if SHPO concurs, then no further action is required under Section 106. If BLM determines that the effect is adverse, additional consultation with SHPO and the ACHP must occur. However, if the value of the NRHP site is strictly for archaeological, historical, architectural, or scientific research, it is possible to avoid an adverse effect determination by implementing a treatment program to recover and preserve these values. Such a treatment program must be reviewed by SHPO.

Because only the first step (inventory) of the Section 106 process has been completed to date, the results of the process cannot be presented here, but will be provided in the Final EIS/EIR for the Project. These results will include a summary of the cultural resources within the Project area determined eligible for the NRHP; the anticipated adverse impacts of the Proposed Action; and a summary of the proposed treatment plan necessary to mitigate the anticipated adverse effects of the Proposed Action.

4.1.6.2. Impacts of the Proposed Action

Since no paleontological resources have been found within the Project area, and none are believed present, the implementation of the Proposed Action would not have an effect on any paleontological resources.

Much of the Project mine and process area is expected to undergo direct impacts from excavation of the open pits and construction and operation of the leach pads, waste rock stockpiles, soil stockpiles, diversion channels, haul and access roads, and associated processing and support facilities. The remaining undisturbed acres within the Project mine and process area are principally the throughgoing ephemeral stream channels and isolated areas located between areas of disturbance. Given the intensive nature of the Proposed Action, all cultural resources within the Project mine and process area are expected to experience either direct or indirect impacts without special mitigation. Because few, if any, of the Project mine and process area components can be relocated, avoidance of the identified cultural resources within the Project mine and process area is difficult.

Indirect impacts to identified cultural resources located adjacent to, but outside of, the Project mine and process area boundary may occur if more intense recreational use occurs in these areas as a result of these uses being excluded from the Project mine and process area. However, because the entire Project mine and process area is completely fenced, no direct impacts are expected from operations conducted within the Project mine and process area to identified cultural resource sites located outside of this boundary.

Project facilities constructed or operated within the Project ancillary area are either narrow, linear features (such as the transmission line, water pipeline, and Indian Pass Road realignments), or features of relatively small surface area (such as the water well pad areas, well pump generator area, and substation area). Because there is generally more flexibility regarding the actual siting of each of these Project components, avoidance of the identified NRHP-eligible cultural resources within the Project ancillary area is possible, although not certain. Indirect impacts to identified cultural resources located adjacent to, or on undisturbed lands inside of, the Project ancillary area may also occur, either as the result of increased use of these areas by Project workers and service personnel, or if more intense recreational use occurs in these areas.

~~An intensive Class III pedestrian survey and cultural resources inventory of the area to be disturbed during the realignment of the junction of Indian Pass Road and Ogilby Road has not yet been conducted. Although the area appears to have been heavily disturbed by historic vehicle traffic, such a survey should still be conducted to document the existence or absence of archeological and historical resources in the areas to be disturbed by the new road alignment. The route of the existing 34.5 kV transmission line, which is to be overbuilt with the 92 kV transmission line, has also not been surveyed for the project, although in this case no new surface disturbance would be created over that previously disturbed by the construction and operation of the existing transmission line.~~

Preliminary evaluations of these resources by the field investigators for significance under criteria for eligibility for the NRHP have determined that the prehistoric trail segments and associated features, all of the geoglyphs, all of the ceramic scatters, the chipping stations (when taken together as a whole) and one (1) rock ring site are likely significant resources potentially eligible for the NRHP under

36 CFR 60.4 criterion "D" (resources "that have yielded, or may likely to yield, information important in prehistory or history") (see also Appendix J-1). The cleared circles, other rock ring sites, and possible milling element were judged likely not significant and not eligible for the NRHP. The probable historic use of historic trails in the area was also judged significant and the trail eligible for the NRHP under 36 CFR 60.4 criterion "D" and criterion "A" (resources "that are associated with events that have made a significant contribution to the broad patterns of our history"). The World War II bivouac sites in the region were judged to not be eligible for the NRHP, consistent with previous determinations by the BLM.

Surface disturbance associated with the construction of the new 92 kV transmission line over the existing IID 34.5 kV transmission line is estimated at a maximum of 21 acres. This consists of redisturbance of many of those areas disturbed during original construction of the 34.5 kV transmission line in the mid-1960's (pole access trails and construction areas) and new disturbance associated with the pole access trails, pole construction areas, cable pulling stations, and construction staging areas. Because there is substantial flexibility regarding the location of the facilities which produce the new surface disturbance, and because all of the significant features are located in portions of the cultural sites outside of the actual transmission line corridor, avoidance of the identified NRHP-eligible cultural resources within the transmission line survey area is judged highly likely (see Appendix J-2). However, indirect impacts to these identified significant cultural resources located adjacent to the transmission line corridor may occur if these areas are incidentally disturbed by transmission line construction workers.

The field investigators evaluated the archeological sites for significance and NRHP-eligibility only under 30 CFR 60.4 criterion "D." Historic sites were evaluated for significance and NRHP-eligibility under the additional criteria "A," "B," and "D" under 30 CFR 60.4. Completion of evaluations and determinations for archeological sites, and of the treatment plan for the archeological sites, will require completion of the ongoing consultation between the BLM and the Quechan Tribe (see Section 3.6.2.2). Actual eligibility for the NRHP will be determined by consultation between the California State Historic Preservation Officer (SHPO) and the BLM based on the eligibility criteria.

Impacts to the cultural resources ultimately determined eligible for the NRHP would be considered significant unless a treatment program to recover the scientific information and other NRHP-qualifying values of each resource is successfully implemented before the Project proceeds with the actions which would impact that resource.

4.1.6.3. Mitigation Measures

Incorporated by Project Design:

No specific measures are incorporated by project design.

Incorporated by Regulation:

No specific measures.

Incorporated to Avoid Potentially Significant Effects:

A detailed treatment plan will be prepared and submitted for SHPO approval once NRHP eligibility is determined and Native American consultation is complete.

Principal treatment will be by avoidance, which may be possible for some of the identified resources within the Project mine and process area, and should be quite likely for those resources identified outside of the Project mine and process area. This includes the historic trail which was judged significant under criterion "A." If avoidance is not possible, it may be preferable to "bury" identified resources under Project stockpiles or the heap if possible and determined preferable to the Quechan Tribe.

Specific treatment programs applicable to the identified resources may include:-

- Collection and laboratory analysis of a ten (10) percent random sample of the chipping stations, analysis of 0.1 percent of the surface area using SHPO's "CARIDAP" light density lithic scatter surface observation grids, and collection and curation of a sample of several types of high quality cryptocrystalline lithics;

- Full data recovery of all of the trails which will experience direct impacts, including careful mapping of extent and linkages to other trail segments, degree of imbeddedness in the desert pavements, amount of stone displacement, variability of trail width and depth, and examination of margins for associated artifacts;

- Full data recovery for the geoglyphs which will be directly impacted, including drawing and photographing each geoglyph and determining the non-randomness of stone selection;

- Mapping and collection of each pot drop to establish the ceramic types, date, and attempted reconstruction of shapes.

► 4.1.6-1: ~~An intensive Class III pedestrian survey and cultural resources inventory of the area in which the junction of Indian Pass Road with Ogilby Road will be realigned, including sufficient buffer areas, must be completed and submitted to the BLM. No notice to proceed for the construction of this junction realignment will be issued under the right-of-way to be granted for Indian Pass until consultation under Section 106 of the Historic Preservation Act for this area is completed.~~

~~► 4.1.6-2:~~ A treatment program to recover the scientific information and qualifying values of each identified cultural resource eligible for the NRHP shall be prepared by qualified parties under contract to the Applicant in consultation with the Quechan Tribe and submitted to the BLM for submittal to SHPO for concurrence. Prior to the start of construction of the Project, the accepted treatment program shall be implemented as necessary for the proposed activities.

► 4.1.6-~~3~~-2: ~~To the extent feasible,~~ Project components to be located in the Project ancillary area shall be sited to avoid direct or indirect impacts to identified NRHP-eligible cultural resources. Prior to commencement of construction of any Project components in the Project ancillary area, specific plans showing the areas intended for surface disturbance shall be submitted to the BLM and BLM approval obtained.

► 4.1.6-~~4~~-3: Applicant shall designate a project contact representative (PCR) who will be responsible for overseeing

Project compliance with the conditions and stipulations for cultural resources. The PCR shall have authority to halt all activities that are in violation of the stipulations. The PCR may be a project manager, company environmental coordinator, or other person identified as responsible by the Applicant. Applicant shall provide the name and contact information of the PCR to the BLM prior to site construction. Should previously unidentified cultural resources be discovered during project operations, Applicant shall immediately cease operations in the immediate vicinity of the discovery and notify the BLM. Operations shall not be reinitiated in the vicinity of the discovery until authorized by the BLM.

- 4.1.6-4: To the maximum extent feasible, surface disturbance created during construction of the 92 kV/34.5 kV transmission line shall avoid all direct impacts to all identified potentially NRHP-eligible cultural resources. Fencing and monitoring procedures identified in the cultural resource survey for the transmission line for the prevention of indirect impacts to these resources shall also be implemented, unless otherwise directed by the BLM. A right-of-way for those portions of the 92 kV/34.5 kV transmission line located on public lands shall be obtained from the BLM, and specific plans showing the areas intended for surface disturbance shall be submitted to the BLM and BLM approval obtained prior to commencement of any construction of the 92 kV/34.5 kV transmission line.

No additional mitigation measures are proposed or recommended.

4.1.6.4. Unavoidable Adverse Effects and Level of Significance After Mitigation

Impacts to those cultural resources ultimately determined eligible for the NRHP would be considered significant unless a treatment program to recover the information qualifying each resource for the NRHP is successfully implemented. Treatment options are available to recover the information qualifying each resource for the NRHP, and it is anticipated that such a treatment program will be prepared (in consultation with the Quechan Tribe), accepted by the SHPO, and implemented to mitigate these potential significant impacts to cultural resources to below the level of significance.

4.1.7. Visual Resources

4.1.7.1. Assumptions and Assessment Guidelines

The Proposed Action would normally have a significant effect on the environment if it would:

- Have a substantial, demonstrable negative aesthetic effect.

4.1.7.2. Impacts of the Proposed Action

Impacts to visual resources from the Proposed Action would result from: lighting of mine and process areas enabling mining to occur during nighttime hours; the visibility of surface disturbance associated with the construction and operation of project facilities; the creation and expansion of waste rock stockpiles; the creation and expansion of heap leach facilities; the creation of open pits; the ~~possible~~ construction of a transmission line; and the dust plumes created from blasting in the open pits.

Nighttime lighting would produce "sky glow" which would be visible to some viewers, such as campers and other nighttime dispersed recreation users in the vicinity, including the adjacent wilderness areas ~~and some passersby in the area~~. These activities would be far away from any concentrated recreation area, such as Glamis or Gold Rock Ranch, or traveled route, such that the magnitude of potential visual impact would not be expected to be significant.

The U.S. Marine Corps (USMC) has established a flight corridor (VFR-299) which occupies air space directly above the Project area. The Project area is currently used by the U.S. Marine Corps for military overflights and for nighttime military operations using Night Vision Devices (NVDs). These devices can detect light at levels much lower than those that are detectable by the unaided human eye and, as such, Project lighting could pose significant hazards to pilots during nighttime NVD overflights. Although the Proposed Action represents only a small portion of the available flight corridor, there would be a potential for significant interference with NVD operations.

The ~~leach pad,~~ heap, waste rock stockpiles, open pits, ~~possible construction of a~~ transmission line, and access road ~~construction~~ constructed as part of the Proposed Action would represent a substantial

visual contrast for viewers ~~in the proximity~~ of the project. The large "south" waste rock stockpile would be constructed to a maximum height of 400 feet, and the heap 300 feet, above existing grade, and will be one (1) to two (2) hundred feet higher than any existing landform immediately adjacent to the Project mine and process area. The East Pit and Singer Pit will also remain open under the Proposed Action.

Implementation of the Reclamation Plan would reduce some of the impacts associated with the surface disturbance over the long term. Following completion of the operation, all structures constructed within the Project area as part of the Proposed Action (buildings, water wells and pipelines, access roads, transmission line and metering station/switchyard, etc.) would be removed and the disturbed areas ~~the access roads constructed under the Proposed Action would be~~ recontoured as necessary and seeded. The tops of the waste rock stockpiles and the heap would be recontoured, seeded, and would ultimately resemble ~~a~~ stepped mesas. This would minimize the contrast of color and lines that would result from the Proposed Action. However, the ~~The~~ open pits, waste rock stockpiles and heap ~~leach pads~~ would remain as a permanent change to the line and form of the area ~~(see Figure 4-2, Figure 4-4, and Figure 4-6)~~.

Although the Project facilities would be clearly visible from Indian Pass Road and other routes of travel in the immediate vicinity of the Project mine and process area~~. However, according to the visual resource analysis prepared as part of this EIS/EIR (see Appendix K)~~, the ~~proposed project~~ Project facilities would not be easily viewable to most passersby in the surrounding area. There would be a limited view of the Project facilities from a single point, KOP #1, on Ogilby Road, the major access road in the vicinity of the site~~(see Figure 4-2).~~ The ~~site~~ Project mine and process area would also be viewable from Black Mountain (KOP #2),~~and~~ from the Picacho Peak Wilderness Area (KOP #3), and from other selected elevated areas in the adjacent mountains ~~(see Figure 4-4 and Figure 4-6)~~, though potential viewers from each of these locations are limited in number.

~~Implementation of the Reclamation Plan would reduce some of the impacts associated with the surface disturbance over the long term. Following completion of the operation, the access roads constructed under the Proposed Action would be recontoured and seeded. The waste rock stockpiles would be recontoured, seeded, and would~~

~~ultimately resemble a stepped mesa. This would minimize the contrast of color and lines that would result from the Proposed Action. The open pits, waste rock stockpiles and heap leach pads would remain as a permanent change to the line and form of the area (see Figure 4-2, Figure 4-4, and Figure 4-6).~~

Photosimulations of the major landforms within the Project mine and process area following completion of mining and reclamation activities have been prepared to simulate views from each of the key observation points. Figure 4-2 shows the view of the Project features from KOP #1, on Ogilby Road. From this viewpoint, only the uppermost portions of the southern end of the "south" waste rock stockpile and the heap would be visible, at a distance of approximately 4 miles, over the slightly elevated terrain in the immediate foreground. These Project landforms would be viewed against the darker forms of Black Mountain and Picacho Mountains on the horizon, and would extend up into the sky.

Photosimulations from KOP #2, Black Mountain, and from KOP #3, the hill immediately south of Indian Pass in the Picacho Peak Wilderness Area, are presented in Figure 4-4 and Figure 4-6, respectively. Viewers from these viewpoints would look down on the Project mine and process area from distances of 4.5 miles and 2 miles, respectively. From KOP #2, the viewer has unobstructed views of the waste rock stockpiles and the top of the heap, although the waste rock stockpiles partially hide both the Singer Pit and the East Pit. From KOP #3, all of the principal Project facilities are visible except the East Pit, which is partially hidden by the "north" waste rock stockpile.

The level of impact to visual resources would depend upon the number of viewers of the project, the viewers' observation point, the compatibility of the operations with the BLM's visual management objectives, and the duration of the disturbance. Visual effects of the Proposed Action were analyzed using the standard procedures in Section 8400 of the BLM Manual. The potential number of daily viewers from KOP #1 (Ogilby Road) may number in the mid-hundreds. The potential number of viewers from KOP #2 would be small, only a few per day, and the number of viewers from KOP #3 is likely to be very small, less than a few per month. ~~The form of the reclaimed project would approach the smooth, rounded character of the surrounding landscape, but would continue to have some areas with a conical form.~~ The line of the reclaimed project would approach ~~soft~~

Figure 4-1: Current View of the Project Mine and Process Area from Ogilby Road (KOP #1)

Figure 4-2: Proposed Action and Complete Pit Backfill Alternative - Projected View of the Project Mine and Process Area from Ogilby Road (KOP #1)

Figure 4-3: Current View of the Project Mine and Process Area from Black Mountain (KOP #2)

Figure 4-4: Proposed Action - Projected View of the Project Mine and Process Area from Black Mountain (KOP #2)

Figure 4-5: Current View of the Project Mine and Process Area from a Hilltop Near Indian Pass in Picacho Wilderness (KOP #3)

Figure 4-6: Proposed Action - Projected View of the Project Mine and Process Area from a Hilltop Near Indian Pass in Picacho Wilderness (KOP #3)

~~and~~ undulating, but would remain discontinuous and have some areas with an angular line. The color of the reclaimed site would approach that of the surrounding landscape. ~~These visual impacts are potentially significant.~~

~~Accordingly, operations~~ Landforms constructed under the Proposed Action would have some visual contrast with the surrounding land even after reclamation. The Project area is located in a ~~Class L (Limited Use)~~ Limited Use area of the CDCA, for which ~~Class II~~ visual resource management objectives, which are semi-equivalent to BLM Class II visual objectives, have been prescribed by the BLM. Based upon the BLM visual resource management objectives for Class II areas (i.e., to retain the existing character of the landscape), the Proposed Action would create potentially significant and unmitigatable impacts to visual resources in the area.

4.1.7.3. Mitigation Measures

Incorporated by Project Design:

- 4.1.7-1: High intensity lighting used for mining and processing operations at night shall be directed downward to reduce fugitive light. Lighting shall have reflectors or shields to further minimize fugitive light. Light stanchions shall be no higher than necessary for safe and efficient lighting.

- 4.1.7-2: Following completion of Project mining activities, all buildings, equipment, supplies, and debris shall be removed to improve the visual appearance of the site.

- 4.1.7-3: Dust suppressants shall be utilized, as necessary and in accordance with ICAPCD permit requirements, on haul roads to minimize fugitive airborne dust generation on the site.

- 4.1.7-4: In conformance with the Reclamation Plan approved by the BLM and Imperial County, disturbed areas shall be recontoured and reseeded or revegetated with native or indigenous species complementary to vegetation found in the surrounding area.

Incorporated by Regulation:

No specific measures.

Incorporated to Avoid Potentially Significant Effects:

- 4.1.7-5: Applicant shall establish a working relationship with the U.S. Marine Corps (USMC) to ensure that nighttime lighting of mine and process areas does not interfere with nighttime overflight operations within flight corridor VFR-299. As part of this mitigation measure, Applicant shall provide the USMC Air Station, Yuma, Arizona, with a detailed, to-scale, map of the Project area identifying the significant surface facilities, transmission lines, and locations of potential light sources to enable the USMC to avoid these areas during their nighttime flight activities.

4.1.7.4. Unavoidable Adverse Effects and Level of Significance After Mitigation

The Proposed Action would result in unavoidable physical changes in the natural contour and character of the Project area. These changes would be visibly apparent over the 20-year estimated life of the Project and would diminish, but continue, through the completion of site reclamation and restoration activities. The physical changes to the area would continue indefinitely, and would ~~become insignificant~~ lessen only after an indefinite period as site reclamation efforts and natural processes restore and revegetate the area to match the surrounding landscape.

The Proposed Action would result in a visual contrast with the surrounding area and would change the existing character of the landscape~~ over the life of the Project and for an indefinite period following site reclamation~~. Based upon BLM objectives for Class II visual areas, the mitigated effects of the Project on visual resources would remain significant.

4.1.8. Noise

4.1.8.1. Assumptions and Assessment Guidelines

The Proposed Action would normally have a significant effect on the environment if it would:

- Increase substantially the ambient noise levels for adjoining areas; or
- Conflict with any applicable noise restrictions imposed by regulatory agencies.

4.1.8.2. Impacts of the Proposed Action

The noise generated by the proposed mining operations would be typical of most construction and mining projects and could be intense for short intervals. Ore loading and handling, and other mine processes, can generate noise levels up to 95 dB(A) at 25 feet. Blasting can cause very short-duration noise levels in excess of 100 dBA at 25 feet.

Noise is attenuated by distance, atmospheric conditions, and topography. Sound wave divergence typically results in a six (6) dBA decrease for every doubling of distance from a noise source (Imperial County Planning Department, 1978). This reduction is highly conservative since it does not account for noise attenuating factors such as topography, wind, temperature gradients, atmospheric pressure, and other site-specific factors, such as the upward deflection of noise generated down in the bottom of a pit. Assuming a maximum noise level of 110 dBA generated from blasting activities, then ambient background noise levels (30 to 50 dBA) would be expected to be approached at a distance of approximately five plus (5+) miles from the Project mine and process area from this activity.

The project site is located in a relatively low-use area. There are no permanent noise-sensitive receptors (i.e., residences, schools, hospitals, etc.) found in the immediate Project area. The nearest permanent noise sensitive receptors are located at the Gold Rock Ranch, approximately seven (7) miles southwest of the Project mine and process area. Based upon the projected attenuation of noise with distance, sound pressure levels generated from blasting and other

activities at the Project mine and process area would approach ambient background levels at this receptor. Although noise levels are expected to be within ambient levels in this area, periodic noise levels from blasting and other activities could be audibly distinguished from natural noise sources, particularly during typically quieter nighttime hours. While noise levels could be discernable, the projected noise levels would not be intrusional and noise impacts would be below levels of significance.

Temporary noise receptors such as those associated with dispersed recreational uses in the area would be impacted by on-site noise generating activities. Some of these receptors may avoid the area during the life of the project. The effects of project generated noise on wildlife is discussed in further detail in Section 4.1.5.3.

4.1.8.3. Mitigation Measures

Incorporated by Project Design:

- 4.1.8-1: All heavy equipment, drilling rigs, and other internal combustion engines shall be equipped with mufflers to minimize noise generated during construction, operation and reclamation activities.

Incorporated by Regulation:

- 4.1.8-2: Applicable Occupational Safety and Health Administration (OSHA) worker noise protection requirements, as set forth in 29 CFR 1910.95, *et seq*, and California Occupational Safety and Health Administration (Cal-OSHA) requirements, as set forth in 8 CCR 5095, *et seq*, shall be implemented by the Applicant.

Incorporated to Avoid Potentially Significant Effects:

- 4.1.8-3: Applicant shall limit blasting activities to daytime hours to minimize nighttime noise disturbance.

4.1.8.4. Unavoidable Adverse Effects and Level of Significance After Mitigation

The Proposed Action would result in unavoidable increases in ambient noise levels within a conservatively estimated five-mile radius of the Project mine and process area over the life of the Project. Noise levels would diminish with distance from the Project noise sources, and ambient noise would decrease with time as the pit walls, heap, and waste rock stockpiles provide increasing topographic attenuation of sound levels from noise sources within the Project mine and process area.

Based on the absence of sensitive noise receptors in the vicinity of the Project area, the mitigated effects of noise from the Project would be below the level of significance.

4.1.9. Land Use

4.1.9.1. Assumptions and Assessment Guidelines

This land use impact assessment evaluates the potential effects of the Proposed Action on existing and planned land uses in the vicinity of the Project area. It also evaluates the effects of the Proposed Action on wilderness and recreational resources in the Project area and vicinity. The Proposed Action would normally have a significant effect on the environment if it would:

- Conflict with adopted environmental plans and goals of the community where it is located;
- Disrupt or divide the physical arrangement of an established community;
- Conflict with established recreational, educational, religious or scientific uses of the area;
- Result in nonconformance with the Wilderness Act of 1964 or the BLM Interim Wilderness Management Policy;

- Substantially degrade or reduce the quantity or quality of the area available for existing or future recreational opportunities; or

- Result in the unmitigated loss of a unique recreational resource.

The effects of the Proposed Action would also be significant if the Project was incompatible with existing land uses in the vicinity, or if the effects of the Proposed Action would not be in conformance with the applicable land use plans and policies described in Section 3.9.1.

4.1.9.2. Impacts of the Proposed Action

Compatibility with Existing Land Uses:

The Project area is undeveloped and the area surrounding the Project area is occupied by large expanses of public land administered by the BLM. The area is relatively isolated and remote from concentrated land uses. The area is generally regarded as open space providing desert habitat for wildlife. The principal land uses in the vicinity of the Project area include: dispersed recreation (hunting, camping, rock collecting, etc.); military aircraft overflight training; and commercial mineral exploration. Two (2) wilderness areas (Indian Pass and Picacho Peak) are located approximately one (1) mile north and east of the Project mine and process area~~,~~; an ACEC (Indian Pass) is located approximately three-quarter (3/4) of a mile north of the Project mine and process area; and three (3) operating precious metal mines (American Girl/Oro Cruz, Mesquite, and Picacho Mines) are located within ten (10) miles south, northwest, and east of the Project area. The nearest residence and area of concentrated public activity is the Gold Rock Ranch, located approximately seven (7) miles southwest of the Project mine and process area, and no other residences exist within ten (10) miles of the site.

Periodic blasting from the mining operations could be a potential hazard to low-flying military aircraft using the general area for training exercises. The new transmission lines installed for the Proposed Action could pose a new potential physical hazard to low-flying aircraft. Project lighting could also pose a hazard during nighttime exercises when pilots are training with night vision devices (NVD) which amplify the available light.

The Project would have no impact on the existing mines in the area. Distant noise and a slight increase in traffic would result in a negligible impact on the nearest residential and visitor inhabitants at Gold Rock Ranch.

More expanded discussions of the potential effects of the Project on surrounding area are provided in the respective air, visual, and noise resource sections of this EIS/EIR.

Compatibility with Adopted Land Use Plans and Policies:

The Project would be compatible with the objectives of the Multiple-Use Class L (Limited Use) classification of the public lands in the vicinity as designated by the BLM CDCA Plan and amendments. The development of locatable minerals on mining claims in areas designated by the BLM as Class L is authorized subject to applicable federal regulations (43 CFR 3809) and state and local laws.

Although the Imperial County General Plan is not directly applicable to activities on public lands administered by the BLM, the Proposed Action would be in conformance with the respective goals and objectives set forth in both the Land Use Element and the Conservation and Open Space Element to the General Plan. The County has also zoned the general area in which the Project area is located as S-Open Space. The zoning classification is not directly applicable to activities on public lands, but the open space classification permits multiple uses consistent with the Conservation and Open Space Element and the General Plan.

Wilderness Areas:

Primary access from the west to the wilderness areas north and east of the Project area is via Indian Pass Road. This road would be realigned to the west around the Project mine and process area over the life of the Project, but the road would be kept open and would not restrict travel to the wilderness areas. Subsequent to the completion of mining activities, the road would be returned to its approximate existing route.

The Project area would be visible from some elevated areas within both the Indian Pass and Picacho Wilderness areas (see Section 4.1.7). Very minor increases in airborne particulates in the

wilderness areas may result from PM_{10} emissions from the Project (see Section 4.1.4). Blasting and other noises generated by the proposed mining activities would be audible within portions of the wilderness areas nearest the Project area (see Section 4.1.8.2). None of these effects would exceed the level of significance.

<u>Recreational Resources</u>:

The entire Project mine and process area (approximately 1,612 acres) would be fenced and closed to the public. Mine construction and operations would not prevent camping, hunting or other dispersed recreational pursuits in offsite areas adjacent to the mine, but Project noise and operations would be expected to discourage some recreational activities in the immediate vicinity of the Project mine and process area over the active life of the mine. There are no unique recreational resources within the Project area, and comparable recreational opportunities would still be available in large areas of public land similar to, but outside of, the Project area. There are approximately 4.4 million acres of BLM Class L lands in the CDCA which are generally available for dispersed recreation. While not intended, the proximity of the mine to Indian Pass Road could attract some visitors to the area as sightseers to observe the large mine equipment and active mining operations. The effects of the Project on recreational resources over the life of the Project would be below the level of significance.

Recreational activities in the immediate vicinity outside of the fenced Project mine and process area would also be affected by the Project. The areas in the immediate vicinity of the Project would be affected by emissions of air pollutants (see Section 4.1.4), visibility of the mine (see Section 4.1.7), noise generated by the mine operations (see Section 4.1.8.2), and Project-related traffic (see Section 4.1.11.1.2). Mitigation measures for air emissions, visibility, noise, and traffic, which are presented in the respective sections of the EIS/EIR, would also reduce the effects of the Project on dispersed recreation in offsite areas in the vicinity of the Project mine and process area. Project facilities outside of the Project mine and process area, including the buried water pipeline and the transmission line, would not affect public access to the primitive campsites along the washes adjacent to Indian Pass Road, and Project operations would not encourage or overly restrict recreational traffic travelling on Indian Pass Road to or from the wilderness areas or other potential recreation

areas located north of the Project area. The effects of the Project on dispersed recreation in the offsite vicinity of the Project mine and process area would be below the level of significance.

Following mining operations, surface facilities would be removed and site reclamation activities would be conducted. The foundations of facility structures would be buried in place, the transmission line constructed along Indian Pass Road would be removed, water wells would be abandoned in conformance with agency requirements, and the buried water pipeline would be abandoned in place. The area would be reopened to the public, but a rock rubble barrier would be constructed around the 227-acre East Pit and 34-acre Singer Pit to barricade the area from vehicle access. The rock barriers constructed around the East Pit and Singer Pit would also indefinitely limit long-term public access to the 261-acre pit areas for many dispersed recreational activities.

As discussed in Section 4.1.5, following site reclamation both vegetation and wildlife habitat values would eventually return to the Project area and, except for limited access to the 261-acre pit areas, opportunities for hunting, hiking, camping and other dispersed recreational activities would again be available in the Project mine and process area. Given the availability of large nearby areas with similar opportunities for dispersed recreation, the mitigated effects of the Project on post-Project recreation resources would be below the level of significance. While the mitigated effects of the Project on recreational resources would be below the level of significance, mitigation measures which would further reduce the effects of the Project on recreational resources are provided in Section 4.1.9.3.

4.1.9.3. Mitigation Measures

<u>Incorporated by Project Design</u>:

- 4.1.9-1: Applicant shall incorporate project design measures to reduce the effects of the Project on air, biological, visual, and noise resources. These measures are described in Sections 4.1.4.3, 4.1.5.4, 4.1.7.3, and 4.1.8.3, respectively.

- 4.1.9-2: At the conclusion of mining activities, Applicant shall recontour all disturbed areas except the pit slopes and the waste rock stockpiles as appropriate to create undulating land forms

that are stable, safe, do not allow for extensive pooling or ponding, and blend with the surrounding undisturbed topography. ~~slopes on waste rock stockpiles, ore heap, and pit walls to stable and safe surfaces and drainage conditions.~~ Applicant shall also construct a loose rock rubble barricade comprised of large boulders or other suitable material~~, or provide an alternative method acceptable to the BLM~~ to prevent vehicle access and restrict public entry into the ~~East Pit~~ open pit area(s).

Incorporated by Regulation:

- 4.1.9-3: Applicant shall conduct mining operations in conformance with the Class L BLM multiple land use ~~objectives~~ guidelines outlined in the CDCA Plan for mining in the area. The Applicant shall also comply with the federal land use requirements prescribed in 43 CFR 3809.

Incorporated to Avoid Potentially Significant Effects:

- 4.1.9-4: Applicant shall keep the USMC air station in Yuma, Arizona apprised of the current schedule for blasting at the mine site to minimize the potential for low-flying military aircraft to be in the vicinity of the Project during blasting activities.

- 4.1.9-5: To facilitate return of the Project area to as near as practical pre-Project condition, Applicant shall, at the end of the active life of the Project, remove the foundations of all facility structures and dispose of the debris at ~~either~~ an offsite waste disposal facility authorized to accept the waste~~ or an onsite, buried disposal site authorized by both the BLM and the CRWQCB~~.

4.1.9.4. Unavoidable Adverse Effects and Level of Significance After Mitigations

The Proposed Action would result in an unavoidable change to the existing land use in the Project area from open space to mining over the 20-year life of the Project. Following completion of mining activities and site reclamation activities, the majority of the Project area would be returned to its availability as open space. However, a loose

rock rubble barricade constructed around the East Pit and Singer Pit areas would indefinitely restrict public access to the 261-acre pit areas.

The mitigated effects of the Project on land use and associated resources would be below the level of significance.

4.1.10. Socioeconomics

4.1.10.1. Assumptions and Assessment Guidelines

The Proposed Action would normally have a significant effect on the environment if it would:

- Induce substantial growth or concentration of population;
- Displace a large number of people;
- Cause a substantial reduction in employment;
- Substantially reduce wage and salary earnings; or
- Cause a substantial net increase in County expenditures.

4.1.10.2. Impacts of the Proposed Action

A net beneficial socioeconomic impact from the construction and operation phases of the Proposed Action would occur over the 20-year lifespan of the Project and the subsequent site reclamation period.

The Project is expected to generate an estimated 100 full-time jobs. During the construction period, approximately 50 to 100 construction jobs would be generated at various times.

Indirect employment opportunities generated by the Project were estimated by applying multipliers commonly used in the mining industry. Dobra (1988) assumes that for every job created in the mining industry, an additional 1.25 job opportunities are created in other sectors of the economy. Therefore, the Project is estimated to create 125 new or continuing job opportunities. The majority of these jobs would be available to residents of Imperial County, California and Yuma County, Arizona.

It is the intent of the Applicant to gradually transfer the experienced employees from the Picacho Mine to the Project as the Picacho operations decline and the Project becomes fully operational. A total of approximately 55 employees would be transferred from the Picacho Mine to the Project. Project annual payroll, including benefits, is estimated to be $5.93 million for 100 employees.

There would be slight increase in demand for housing and community services in the Imperial County, California and Yuma County, Arizona areas over the life of the Project.

The following estimates of Project expenditures and estimated tax revenues from the Project were provided by Chemgold (McArthur, 1995; Steve Baumann, 1996).

- Approximately $48 million in capital would be expended for the Project during 1997. Sales tax on these capital expenditures would amount to approximately $3.72 million. For each year thereafter, average annual capital expenditures would amount to approximately $1.7 million, generating approximately $0.13 million per year in sales tax for capital expenditures only.

- Annual estimated non-capital expenditures are estimated to total $26 million (including payroll).

- Geographic distribution of annual non-capital expenditures have been estimated using data derived from the Picacho Mine operations. It is estimated that 37.1 percent ($9.65 million) of non-capital expenditures would be made in California and 38.1 percent ($9.9 million) would be made in Arizona, for an estimated total of 75.2 percent ($19.55 million) in local non-capital expenditures. The remaining 24.8 percent ($6.45 million) of non-capital expenditures would be made in areas outside of California and Arizona.

- Property taxes in Imperial County are assessed at approximately 1.1 percent per year of the total assessed value. Depending on the assessed valuation of the Project property, projected property taxes are estimated to range between $250,000 and $600,000 per year.

4.1.10.3. Mitigation Measures

No mitigation measures are proposed or recommended.

4.1.10.4. Unavoidable Adverse Effects and Level of Significance After Mitigation

There would be no unavoidable adverse socioeconomic effects from the Proposed Action. Beneficial socioeconomic effects would result from the Project in the form of employment opportunities, tax revenues and increased spending in the local area for goods and services by Project employees and contractors. The socioeconomic effects of the Project would be below the level of significance.

4.1.11. Roads~~, Utilities~~ and Public Services

4.1.11.1. Road and Transportation System

4.1.11.1.1. Assumptions and Assessment Guidelines

The Proposed Action would normally have a significant effect on the environment if it would:

- Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system; or
- Prevent or substantially reduce public access through the elimination of existing routes of travel.

4.1.11.1.2. Impacts of the Proposed Action

The Proposed Action would require the realignment of an approximate 6,000-foot section of Indian Pass Road around the western perimeter of the Project mine and process area to allow for excavation of the West Pit in the current road location. This realignment would also allow for the diversion of an existing drainage channel around the proposed West Pit and the waste rock and soil stockpiles in the northwest portion of the Project mine and process area. The relocated road would cross the adjacent wash "at-grade" at two (2) locations; one (1) upstream and one (1) downstream of the Project mine and process area.

Chemgold has committed to maintaining Indian Pass Road open to the public during construction of the relocated portion of the road; posting signs at the two (2) wash crossings along the relocated portion of Indian Pass Road warning drivers not to cross the wash when flooded, and undertaking emergency repairs or maintenance if Indian Pass Road is damaged by flooding where it crosses these washes. Chemgold has also committed to returning the realigned section of Indian Pass Road back to its approximate original alignment following completion of backfilling of the West Pit. The resulting impacts to Indian Pass Road from the road relocation would be below the level of significance.

The Proposed Action would also result in the realignment of the intersection of Indian Pass Road and Ogilby Road to change the acute angle of the intersection to a right angle. The section of Indian Pass Road which would be replaced would be reclaimed by Chemgold. The net effects of changing the road intersection would be beneficial to the road system, and any adverse effects resulting from changing the intersection would be below the level of significance.

The Proposed Action would result in ~~approximately~~ an estimated 47 lightweight vehicle round-trips to the Project area daily, and ~~approximately~~ an estimated three and one-half (3½) heavyweight vehicle round-trips per day. This estimate assumes that a substantial percentage of approximately 150 workers carpool to the site, which is consistent with the experience with other mines in the area. Traffic volume could be higher if fewer workers carpooled, and will likely be somewhat higher during the approximate six (6) month construction period ~~would likely be somewhat higher~~ as a result of the additional workers and truck traffic. Although no traffic counts are available for either Ogilby Road in the vicinity of the Project, or for Indian Pass Road, traffic volume is believed very light on both roads. Project employees would work staggered shifts and different work periods. This would result in dispersed traffic flow to and from the Project area throughout the day. Chemgold has committed to realigning the intersection of Ogilby Road and Indian Pass Road to a right angle, and there appears no need for construction of either a right- or left-hand turn pocket on Ogilby

Road. The effects of traffic associated with the Proposed Action would be below the level of significance.

Neither Hyduke Road nor the BLM open routes of travel were constructed for heavy vehicle use, and moderate to extensive upgrade of these roads would be required to permit heavy vehicle traffic. Chemgold has committed that none of these roads in the vicinity of the Project mine and process area would be used for heavy truck or equipment traffic. Fencing of the Project mine and process area and construction of the Project facilities would close several BLM open routes of travel located within the Project mine and process area. However, public vehicular access to all areas around the Project mine and process area is still available to the public on all sides of the Project mine and process area from BLM routes of travel, Indian Pass Road, and Hyduke Road, which would remain open (see Figure 2-6). Thus, the level of impacts to roads, and the impacts to public access in the vicinity of the Project, would be below the level of significance.

4.1.11.1.3. Mitigation Measures

<u>Incorporated by Project Design</u>:

- 4.1.11.1-1: Applicant shall realign ~~and maintain~~ an approximate 6,000-foot section of Indian Pass Road around the Project mine and process area prior to surface disturbance which would impede through traffic on the road, and shall maintain~~ed~~ Indian Pass Road open to the public during construction of the relocated portion. Applicant shall maintain Indian Pass Road from the intersection with Ogilby Road to a point beyond the Project mine and process area during the active life of the Project in consultation with the Imperial County Public Works Department.

- 4.1.11.1-2: Applicant shall not route heavy traffic over Hyduke Road during the transfer of equipment from the Picacho Mine site to the Project area.

- 4.1.11.1-3: Following completion of backfilling of the West Pit, Applicant shall return that section of Indian

Pass Road realigned prior to mine construction back to its approximate original alignment and implement site reclamation activities on the realigned segment.

- 4.1.11.1-4: Applicant shall post warning signs at the two (2) wash crossings along the relocated portion of Indian Pass Road warning drivers not to cross the wash when flooded, and shall undertake ~~emergency~~ repairs or maintenance, as may be necessary and authorized by Imperial County, if Indian Pass Road is damaged by flooding where it crosses these washes.

- 4.1.11.1-5: Applicant shall apply water and/or a chemical dust inhibitor acceptable to Imperial County and the BLM to Indian Pass Road from its intersection with Ogilby Road to the boundary of the Project mine and process area.

- 4.1.11.1-6: Applicant shall acquire the necessary approvals of the BLM and Imperial County to construct the relocated section of Indian Pass Road and the realigned intersection of Indian Pass Road and Ogilby Road, and shall design, construct and maintain these facilities in accordance with the conditions of these permits.

Incorporated by Regulation:

No specific measures.

Incorporated to Avoid Potentially Significant Effects:

- 4.1.11.1-~~6~~7: Applicant shall encourage employees to carpool to the Project area.

4.1.11.1.4. Unavoidable Adverse Effects and Level of Significance After Mitigation

The Proposed Action would unavoidably increase traffic on public roads in the vicinity of the Project area over the 20-year life of the Project.

The mitigated effects of the Proposed Action on traffic and the local transportation system in the vicinity of the Project area would not exceed levels of significance.

4.1.11.2. Utilities

4.1.11.2.1. Assumptions and Assessment Guidelines

The Proposed Action would normally have a significant effect on the environment if it would:

- Encourage activities requiring large amounts of fuel, water, or energy;
- Use fuel, water, or energy in a wasteful manner;
- Breach published national, state, or local standards relating to solid waste or litter control; or
- Extend a sewer trunk line with capacity to serve new development.

4.1.11.2.2. Impacts of the Proposed Action

Extending utility electrical service to the Project area would result in construction of: overbuilding approximately sixteen (16) miles of existing IID 34.5 kV transmission line with 92 kV transmission line in the corridor from Interstate 8 to the line's intersection with Indian Pass Road; and construction of approximately 4.5 miles of new 92 kV transmission line, with a probable underbuilt 7.2 kV line, extending from the intersection of the IID's existing 34.5 kV transmission line to a 92 kV/7.2 kV step-down substation in the Project area. Existing access roads would be utilized to upgrade/install the transmission lines. The overbuilt 92 kV transmission line would be built in the existing 20-foot-wide± IID right-of-way (ROW)~~, and no new surface disturbance over that area disturbed during the construction of the original line is anticipated~~. During periods of utility service interruption, an on-site, ≥500 kW, diesel-powered generator would be used to provide emergency power for essential loads and services.

No telephone utility services are directly available to the Project area. A telephone communications relay to existing Black Mountain communication facilities would be installed to provide telephone service to the offices and maintenance shop via a microwave system which would be located within the Project area. Field communications would be provided by an FM mine communication system. Some concern has been expressed by the USMC that the use of the microwave system and/or the FM mine communication system could potentially interfere with pilot communications during military overflights of the Project area and vicinity.

No utility-provided natural gas service is available to the Project area.

No utility-provided water services are available to the Project area. Water for mine operations and fire protection requirements would be produced from ground water wells constructed southwest of the Project area and piped in a buried pipeline to the Project area. The produced water would be stored in an on-site water storage tank for mining and fire protection requirements. Water collected in the open pits would be used where possible for roadway dust suppression purposes.

Project employees and contractors, and their respective families, relocating to the local area would increase the demand for utility services. However, the Proposed Action is not expected to generate significant population growth or demand for utility services.

4.1.11.2.3. Mitigation Measures

Incorporated by Project Design:

- 4.1.11.2-1: Applicant shall make available an on-site, diesel-fuel generator to meet emergency power needs for essential loads and services during periods of utility-provided electrical service interruption.

<u>Incorporated by Regulation</u>:

No specific measures.

<u>Incorporated to Avoid Potentially Significant Effects</u>:

- 4.1.11.2-2~~3~~: Applicant shall work with the USMC to ensure that neither the microwave communication system nor the FM Project communication system interfere with military overflight communications.

- 4.1.11.2-3~~4~~: Applicant shall acquire the necessary approvals of the BLM, Imperial Irrigation District, and other appropriate agencies to construct the 92 kV transmission line over the existing 34.5 kV transmission line, and shall design, construct and maintain this transmission line in accordance with the conditions of these permits, including avoiding the disturbance of any new surface areas during construction.

4.1.11.2.4. Unavoidable Adverse Effects and Level of Significance After Mitigation

The Proposed Action may result in the consumption of utility-provided electrical power. No other public utility services would be utilized by the Project. The effects of the Proposed Action on utility services would not exceed the level of significance.

4.1.11.3. Public Services

4.1.11.3.1. Assumptions and Assessment Guidelines

The Proposed Action would normally have a significant effect on the environment if it would:

- Create a substantial demand for public services.

4.1.11.3.2. Impacts of the Proposed Action

No public or community services are available in the Project area. Septic treatment systems with leach drain fields would be constructed near the office and shop facilities, near the processing and laboratory facilities, and near the lime storage facilities. Produced ground water stored on the site would be used for commodes and hand-washing. Bottled water would be provided for drinking water.

The Project mine and process area is located on the township line between T.13S., R.21E. and T.14S., R.21E., and between eight (8) and nine (9) GLO/BLM Cadastral Survey monuments are likely located within the Project mine and process area along the township line. (None of the sections adjoining the township line within the Project mine and process area are surveyed or monumented.) Although some of these township line monuments may be able to be protected and maintained, damage or destruction to others within the Project mine and process boundary is inevitable since several are located within the current projected pit or waste rock stockpile boundaries. Any monuments which may be subject to damage or destruction should be perpetuated by the installation and survey of witness monuments, subject to the prior approval of the survey by the BLM Cadastral Survey.

Project employees and contractors, and their respective families, relocating to local communities would increase the demand for public and community services. Most families would be expected to reside in either Imperial County, California or Yuma County, Arizona. However, the Proposed Action is not expected to result in a significant increase in population nor generate significant new demand for public or community services.

4.1.11.3.3. Mitigation Measures

Incorporated by Project Design:

- 4.1.11.3-1: Applicant shall provide an on-site septic system for wastewater treatment, which shall be removed upon completion of Project activities.

- 4.1.11.3-2: When no longer required for Project operations, Applicant shall remove that portion of the 92/~~7.5~~ 7.2 kV transmission line owned by the Project and the electric metering station.

Incorporated by Regulation:

- 4.1.11.3-3: Applicant shall obtain necessary permit(s) for on-site sanitary facilities from the Imperial County Department of Health Services.

- 4.1.11.3-4: To the extent feasible, all GLO/BLM Cadastral Survey monuments shall be avoided and protected from any accidental damage or destruction. All monuments which may be subject to either intentional or accidental damage or destruction within the Project mine and process area shall be perpetuated by the installation and survey of witness monuments, subject to the prior approval of the survey by the BLM Cadastral Survey and conformance with the applicable California codes.

Incorporated to Avoid Potentially Significant Effects:

No specific measures.

4.1.11.3.4. Unavoidable Adverse Effects and Level of Significance After Mitigation

The Proposed Action would result in a slight increase in demand for public services. The effects of the Proposed Action on public services would be below the level of significance.

4.1.12. Emergency Services and Public Safety

4.1.12.1. Assumptions and Assessment Guidelines

The Proposed Action would normally have a significant effect on the environment if it would:

- Create a potential health hazard or involve the use, production, or disposal of materials which pose a hazard to people or animal or plant populations in the area affected;

- Interfere with emergency response plans or emergency evacuation plans.

4.1.12.2. Impacts of the Proposed Action

Design elements of the Project design would minimize the need for offsite emergency services. The Proposed Action would not require routine patrol services by the police as on-site personnel would patrol the Project area 24-hours per day providing security. The Project mine and process area and solution ponds would be completely fenced to prevent unlawful site access. "No trespassing" signs and other warnings would be strategically located along perimeter locations of the property. If needed, police services would be provided by the Imperial County Sheriff's department. The nearest sheriff's substation is located in Winterhaven, approximately 28 road miles from the Project mine and process area.

The Project facilities would be equipped with on-site fire protection systems. Fire services would also be available from the Imperial County Fire Department station at Winterhaven.

Mine chemicals/blasting agents and associated explosives would be stored in locked magazines in compliance with U.S. Bureau of Alcohol and Firearms (BATF), and Mine Safety and Health Administration (MSHA) safety standards.

Relatively large volumes of hazardous, and potentially hazardous, chemicals would be transported to, and stored within, the Project area, including: blasting agents and explosives; solid and liquid sodium cyanide; sodium hydroxide; hydrochloric acid; polymaleic acid; ammonium nitrate; diesel fuel; unleaded gasoline; and motor oil. The transport, storage, and handling of these materials would represent a continuing potential for adverse effects from spills into the environment and safety of the public and Project employees. However, the potential adverse effects of the Project resulting from the transportation, storage, and handling of hazardous materials is below the level of significance.

Some of the chemicals and hazardous materials to be stored in the Project area are incompatible and reactive substances. In particular, a spill or mixing of sodium cyanide with an acid would result in the release of toxic hydrogen cyanide gas. The Project design indicates that cyanide chemicals and acids would never be stored near each other, and the Project would implement triple-redundant procedures to ensure an event would not happen (Personal Communication - Steve Baumann, Chemgold). Further, the use of these chemicals is a standard practice and recognized potential hazard at heap leach precious metal mines, and a potential hazard which employee training and good handling practices would be expected to prevent. -It is extremely unlikely that the use of these chemicals within the Project mine and process area would pose any risk to individuals offsite. The mitigated potential for the Project to create a hydrogen cyanide gas health hazard would be below the level of significance.

There would be a potential for public safety related impacts due to the transport of hazardous chemicals to the Project area via public highways and access roads. The probability of hazardous chemical spillage occurring due to a transport accident is considered low, but the potential for occurrence cannot be entirely eliminated. A hazardous material spill contingency plan would be prepared by the Applicant to respond to potential hazardous material and chemical spills within the Project area. The potential risk of a public safety hazard resulting from spills of hazardous chemicals being transported to the Project area would be below the level of significance.

Following completion of mining and site reclamation activities, the East Pit and Singer Pit would remain open, and the steep sidewalls of the open pits would result in a continuing potential public safety risk. However, elements of the Project design include construction of a loose rock rubble barricade around the open pits to prevent vehicle entry and to reduce public access. The effects of the Project on public safety from the remnant open pits would be below the level of significance.

4.1.12.3. Mitigation Measures

Incorporated by Project Design:

- 4.1.12-1: Applicant shall provide appropriate levels of on-site security, fire protection services, and emergency first-aid medical services.

- 4.1.12-2: Applicant shall construct and maintain a fence around the perimeter of the Project mine and process area over the life of the Project.

- 4.1.12-3: Before removal of the perimeter fence at the end of the active life of the Project, Applicant shall construct a loose rock rubble barricade comprised of large boulders or other suitable material~~, or an alternative method acceptable to the BLM,~~ to prevent vehicle access and limit public access to the exposed open pit(s).

- 4.1.12-4: Applicant shall post no trespassing and hazardous chemical signs in English and Spanish strategically located along perimeter locations of the Project mine and process area.

- 4.1.12-5: Applicant shall prepare a hazardous material spill/release contingency plan and provide appropriate training to all Project employees on the proper response to potential chemical releases.

Incorporated by Regulation:

- 4.1.12-6: Applicant shall prepare and maintain a hazardous material business plan in conformance with the requirements of Imperial County.

- 4.1.12-7: Applicant shall conform with all applicable safety regulations required by the Mine Safety and Health Administration (MSHA), Occupational Safety and Health Administration (OSHA), and California Occupational Safety and Health Administration (Cal-OSHA).

Incorporated to Avoid Potentially Significant Effects:

- 4.1.12-8: Applicant shall prepare an emergency response contingency plan which provides for actions to be taken in the event of an injury accident, hazardous materials release, fire, or other emergency situation. The emergency response contingency plan shall include emergency phone numbers and services available for both surface and air transport of injured employees.

4.1.12.4. Unavoidable Adverse Effects and Level of Significance After Mitigation

The Proposed Action would have the unavoidable indirect potential to adversely effect worker and/or public safety through the accidental spill or release of hazardous substances either in transport to the Project area or from activities within the Project area. This mitigated potential effect is considered low to remote, but the potential for the adverse effect cannot be entirely eliminated.

The mitigated effects of the Proposed Action on emergency services and public safety is below the level of significance.

4.1.13. Other Resources

4.1.13.1. Assumptions and Assessment Guidelines

The Proposed Action would normally have a significant effect on the environment if it would:

- Convert prime agricultural land to non-agricultural use or impair the agricultural productivity of prime agricultural land.

4.1.13.2. Impacts of the Proposed Action

The Proposed Action would have no impacts to: prime and unique farmland; floodplains; ACECs; or wild and scenic rivers~~; or areas of traditional Native American religious concern~~.

4.1.13.3. Mitigation Measures

No mitigation measures are required.

4.1.13.4. Unavoidable Adverse Effects and Level of Significance After Mitigation

The Proposed Action would have no unavoidable adverse effects on other resources.

4.2. Reduced Project Alternative

As discussed in Section 2.2.1, under the Reduced Project Alternative, the scale of the Project would be reduced to between the Proposed Action and the No Action Alternative, depending on the actual decrease in scope of the Project. The scope of the smallest potentially economical project was defined for comparison purposes. This Reduced Project Alternative would eliminate the following Proposed Action facilities: (a) East Pit; (b) "east" waste rock stockpile; (c) south soil stockpile; and (d) one of the north stockpiles. The total surface area of disturbance would be reduced from ~~1,400~~ 1,392 acres to approximately ~~861~~ 853 acres, and the Project life would be decreased from approximately twenty (20) years to about ten (10) years. The West Pit would not be backfilled, and the Indian Pass Road realignment would be permanent.

4.2.1. Geology and Mineral Resources

4.2.1.1. Impacts of the Reduced Project Alternative

Except for leaving the precious metal resources in the East Pit area unmined, there would be no substantive difference in the impacts of the Reduced Project Alternative on geology and mineral resources from those identified for the Proposed Action (see Section 4.1.1.2). The effects of the Reduced Action Alternative on geology and mineral resources would be below the levels of significance.

4.2.1.2. Mitigation Measures

Measures to reduce the effects of the Reduced Project Alternative on geology and mineral resources would be the same as those measures identified for the Proposed Action (see Section 4.1.1.3).

With implementation of the identified measures, the mitigated effects of the Reduced Project Alternative on geology and mineral resources would be below the level of significance.

4.2.2. Soil Resources

4.2.2.1. Impacts of the Reduced Project Alternative

The Reduced Project Alternative would decrease the area of surface disturbance from ~~1,400~~ 1,392 acres to ~~861~~ 853 acres, or an approximate 38 percent reduction in surface area disturbed compared to the Proposed Action. This would translate to an approximate 38 percent reduction in the effects of the Project on soil resources (see Section 4.1.2.2). Other potential impacts, such as erosion, would be the same as those identified for the Proposed Action in Section 4.1.2.2. The effects of the Reduced Action Alternative on soil resources would be below the levels of significance.

4.2.2.2. Mitigation Measures

Measures to reduce the effects of the Reduced Project Alternative on soil resources would be the same as those measures identified for the Proposed Action (see Section 4.1.2.3). With implementation of the identified measures, the mitigated effects of the Reduced Project Alternative on soil resources would be below the level of significance.

4.2.3. Hydrologic Resources

4.2.3.1. Impacts of the Reduced Project Alternative

The Reduced Project Alternative would eliminate surface facilities from the northeast portion of the Project area and would not impact the existing surface drainage channels in that area. The East Pit would not be mined and the potential for ~~a pit lake~~ seeps in the East Pit would be eliminated; however, the ~~elimination of the East Pit would prevent the backfilling of the~~ West Pit would not be backfilled under the Reduced Project Alternative. While the Singer Pit would not be mined below the ground water elevation, the West Pit is projected to be mined to a depth below the existing ground water level, and ground water is expected to be encountered in the West Pit during mining operations. ~~However, calculations~~ Calcualtions comparing pit inflow

and pit outflow rates indicated that the formation of a pit lake is unlikely, and Chemgold has committed to backfilling the West Pit to an elevation that is above the predicted level of any pit lake should a study reasonably determine that a pit lake may form.

The Reduced Project Alternative would have an estimated life expectancy of ten (10) years and a proportional decrease in ground water production would result from the shortened Project, but the rate of drawdown over the Reduced Project Alternative life would be comparable to the Proposed Action. The potential for surface water and ground water impacts would otherwise be approximately equivalent to those described for the Proposed Action (see Section 4.1.3.1.2 and Section 4.1.3.2.2).

4.2.3.2. Mitigation Measures

Measures to reduce the effects of the Reduced Project Alternative on surface water and ground water resources would be the same as those measures identified for the Proposed Action (see Section 4.1.3.1.3 and Section 4.1.3.2.3). With implementation of the identified measures, the mitigated effects of the Reduced Project Alternative on surface water and ground water resources would be below the level of significance.

4.2.4. Air Resources

4.2.4.1. Impacts of the Reduced Project Alternative

The air resource impacts of the Reduced Project Alternative would be approximately the same as the air resource impacts generated by the Proposed Action, except that they would be of a shorter duration (see Section 4.1.4.2).

4.2.4.2. Mitigation Measures

Measures to reduce the effects of the Reduced Project Alternative on air resources would be the same as those measures identified for the Proposed Action (see Section 4.1.4.3). The mitigated impacts of the Reduced Action Alternative on air resources would be below the levels of significance.

4.2.5. Biological Resources

4.2.5.1. Impacts of the Reduced Project Alternative

The Reduced Project Alternative would diminish the loss of shrub/scrub vegetation from ~~1,300~~ 1,292 acres to approximately ~~810~~ 802 acres, and the loss of shrub/tree vegetation from 100 to approximately 51 acres, as a result of mine construction compared to the Proposed Action. Similarly, the decreased surface area of the Reduced Project Alternative would reduce the wildlife habitat losses of desert succulent scrub habitat to approximately ~~810~~ 802 acres and microphyll woodland habitat to approximately 51 acres.

The East Pit would not be mined, but the 124-acre West Pit would be mined and not backfilled, except as may be necessary to backfill the pit to a level which would be necessary to preclude the formation of any pit lake (see Section 2.2.1). The Reduced Project Alternative project life would be approximately 10 years, or about 10 years shorter than the Proposed Action. Similar to the Proposed Action, a loose rock barrier would be constructed around the West Pit to restrict terrestrial wildlife access. Temporary diversions of throughgoing washes around the pit would become permanent and would be restored during site reclamation to approximately the same area of microphyll woodland habitat as existed before the Reduced Project. Site reclamation activities would restore approximately ~~737~~ 729 acres of surface within the Reduced Project Alternative mine and process area to habitat available to deer and other terrestrial species, but the 124 acres comprising the West Pit would not be accessible by many of these species. Approximately 30 net acres of existing microphyll woodland habitat within internal drainages located within the area of the West Pit, leach pad and waste rock stockpile could not be restored to microphyll woodland habitat.

The effects of the Reduced Project Alternative on vegetation and wildlife resources would otherwise be approximately equivalent to those described for the Proposed Action (see Section 4.1.5.2 and Section 4.1.5.3).

4.2.5.2. Mitigation Measures

Measures to reduce the effects of the Reduced Project Alternative on biological resources would be the same as those measures identified for the Proposed Action (see Section 4.1.5.4). With implementation of the identified measures, the mitigated effects of the Reduced Project Alternative on biological resources would be below the level of significance.

4.2.6. Cultural and Paleontological Resources

4.2.6.1. Impacts of the Reduced Project Alternative

The Reduced Project Alternative would create approximately 38 percent less surface disturbance than the Proposed Action within the Project area, and identical surface disturbance within the 92 kV/34.5 kV transmission line area. However, the density of cultural resources identified within the area of the Project mine and process area which would <u>not</u> be disturbed under the Reduced Project Alternative is substantially lower than in the portion to be disturbed, and few of the identified sites within this undisturbed area have been judged potentially eligible for the NRHP. Therefore, the impacts of the Reduced Project Alternative on cultural resources appear to be only slightly less than the impacts to cultural resources which would result from the implementation of the Proposed Action.

4.2.6.2. Mitigation Measures

Measures to reduce the effects of the Reduced Project Alternative on cultural and paleontological resources would be the same as those measures identified for the Proposed Action (see Section 4.1.6.3). However, as with the Proposed Action, until such time as the treatment plan is completed and accepted by the SHPO, it is not possible to determine the actual level of significance of the impacts to cultural resources.

4.2.7. Visual Resources

4.2.7.1. Impacts of the Reduced Project Alternative

The effects of the Reduced Project Alternative on visual resources would be approximately equivalent to those identified for the Proposed Action (see Section 4.1.7.2). The shortened project life would allow site reclamation activities to begin 10 years sooner. The effects of the Reduced Project Alternative on visual resources would not meet the BLM Class II visual objectives for CDCA limited use areas and would be above the level of significance.

4.2.7.2. Mitigation Measures

Measures to reduce the effects of the Reduced Project Alternative on visual resources would be the same as those measures identified for the Proposed Action (see Section 4.1.7.3). However, with implementation of the identified measures, the mitigated effects of the Reduced Project Alternative on visual resources would remain inconsistent with BLM objectives for Class II visual areas, and the mitigated effects of the Reduced Project Alternative on visual resources would remain significant.

4.2.8. Noise

4.2.8.1. Impacts of the Reduced Project Alternative

Noise generated by the Reduced Project Alternative would be approximately the same as noise generated by the Proposed Action, and the effects of the noise generated on potential noise receptors would also be approximately the same as that described for the Proposed Action (see Section 4.1.8.2), except that they would cease sooner. The noise effects of the Reduced Action Alternative would be below the levels of significance.

4.2.8.2. Mitigation Measures

Measures to reduce the noise effects of the Reduced Project Alternative would be the same as those measures identified for the Proposed Action (see Section 4.1.8.3). With implementation of the identified measures, the mitigated effects of the Reduced Project Alternative on noise would be below the level of significance.

4.2.9. Land Use

4.2.9.1. Impacts of the Reduced Project Alternative

Over its active life, the Reduced Project Alternative would have essentially equivalent effects on land use as those described for the Proposed Action (see Section 4.1.9.2). The 10-year, versus 20-year, life of mining operations under the Reduced Project Alternative would allow for site reclamation activities to be implemented approximately ten (10) years sooner than for the Proposed Action. The effects of the Reduced Action Alternative on land use would be below the levels of significance. The Reduced Project Alternative would result in decreased access to the 124-acre West Pit. The loose rock rubble barrier constructed around the pit would limit the availability of the area to some dispersed recreational activities. The remaining ~~737~~ 729 acres of the Reduced Project Alternative mine and process area would be restored during site reclamation and would be accessible to the public.

4.2.9.2. Mitigation Measures

Measures to reduce the effects of the Reduced Project Alternative on land use would be the same as those measures identified for the Proposed Action (see Section 4.1.9.2). With implementation of the identified measures, the mitigated effects of the Reduced Project Alternative on land use would be below the level of significance.

4.2.10. Socioeconomics

4.2.10.1. Impacts of the Reduced Project Alternative

The Reduced Project Alternative would generally have a negative impact on socioeconomic effects when compared to the Proposed Action (see Section 4.1.10.2). Employment opportunities for up to 100 employees would be shortened in duration by approximately 10 years. Similarly, non-capital expenditures of $26 million per year ($260 million over a ten-year shorter operating life) and associated sales taxes would be lost. Initial capital expenditures would not change substantially from those projected for the Proposed Action, but annual capital expenditures of approximately $1.17 million ($11.7 million over the 10-year shorter operating life) and associated sales taxes of

approximately \$0.13 million per year (\$1.3 million over the shorter operating life) would also be lost.

4.2.10.2. Mitigation Measures

No measures are required to reduce the effects of the Reduced Project Alternative on socioeconomics.

4.2.11. Roads~~, Utilities~~ and Public Services

4.2.11.1. Impacts of the Reduced Project Alternative

The Reduced Project Alternative would have approximately the same effects on roads, utilities, and public services as would the Proposed Action (see Section 4.1.11.1.2, Section 4.1.11.2.2, and Section 4.1.11.3.2). The principal differences would be the shortened project life (10 years compared to 20 years), and the inability to backfill the West Pit with mined backfill because the East Pit would not be mined. Because the West Pit would not be backfilled, the road would not returned to its original alignment at the end of mining operations as indicated in the Proposed Action. The effects of the Reduced Project Alternative on roads, utilities, and public services would all be below the levels of significance.

4.2.11.2. Mitigation Measures

Measures to reduce the effects of the Reduced Project Alternative on roads, utilities, and public services would be the same as those measures identified for the Proposed Action (see Section 4.1.11.1.3, Section 4.1.11.2.3, and Section 4.1.11.3.3). With implementation of the identified measures, the mitigated effects of the Reduced Project Alternative on roads, utilities and public services would be below the level of significance.

4.2.12. Emergency Services and Public Safety

4.2.12.1. Impacts of the Reduced Project Alternative

Over its active life, the Reduced Project Alternative it would have approximately the same effects on emergency services and public safety as would the Proposed Action (see Section 4.1.12.2). The Reduced Project Alternative would leave the West Pit unbackfilled,

with approximately equivalent potential public safety hazards as would exist from the unbackfilled East Pit following the Proposed Action. The effects of the Reduced Action Alternative on emergency services and public safety would be ~~potentially~~ less than significant.

4.2.12.2. Mitigation Measures

Measures to reduce the effects of the Reduced Project Alternative on emergency services and public safety would be the same as those measures identified for the Proposed Action (see Section 4.1.12.3). With implementation of the identified measures, the mitigated effects of the Reduced Project Alternative on emergency services and public safety would be below the level of significance.

4.3. Complete Pit Backfill Alternative

The Complete Pit Backfill Alternative would have generally the same effects on all environmental resources over the life of the Project as those described for the Proposed Action (see Section 4.1). However, at the conclusion of mining operations, mined rock from the waste rock stockpiles would be hauled back to the open East Pit to backfill the pit at least to surface grade. Backfilling operations, including loading, hauling, and dumping, would continue for up to an estimated 5.25-year period after the conclusion of mining operations and before many of the site reclamation activities can be initiated.

4.3.1. Geology and Mineral Resources

4.3.1.1. Impacts of the Complete Pit Backfill Alternative

Except for backfilling of the open pits, there would be no substantive difference in the impacts of the Complete Pit Backfill Alternative on geology and mineral resources from those identified for the Proposed Action (see Section 4.1.1.2). However, mineral resources exposed at the bottom of open pits which are not commercially minable under current economic conditions would be unavailable for subsequent mining without potentially cost-prohibitive removal of the backfilled waste rock. The effects of the Complete Pit Backfill Alternative on geology and mineral resources would be still below the levels of significance.

4.3.1.2. Mitigation Measures

Measures to reduce the effects of the Complete Pit Backfill Alternative on geology and mineral resources would be the same as those measures identified for the Proposed Action (see Section 4.1.1.3). With implementation of the identified measures, the mitigated effects of the Complete Pit Backfill Alternative on geology and mineral resources would be below the level of significance.

4.3.2. Soil Resources

4.3.2.1. Impacts of the Complete Pit Backfill Alternative

The Complete Pit Backfill Alternative would result in the same impacts on soil resources as described by the Proposed Action (see Section 4.1.2.2). With the backfilling of waste rock and closure of the open pits, the effects of surface erosion within the Project area would be expected to decrease slightly compared to those effects identified for the Proposed Action. The effects of the Complete Pit Backfill Alternative on soil resources would be below the levels of significance.

4.3.2.2. Mitigation Measures

Measures to reduce the effects of the Complete Pit Backfill Alternative on soil resources would be the same as those measures identified for the Proposed Action (see Section 4.1.2.3). With implementation of the identified measures, the mitigated effects of the Complete Pit Backfill Alternative on soil resources would be below the level of significance.

4.3.3. Hydrologic Resources

4.3.3.1. Impacts of the Complete Pit Backfill Alternative

The effects of the Complete Pit Backfill Alternative on surface and ground water resources would remain generally the same as those effects described for the Proposed Action (see Section 4.1.3.1.2 and Section 4.1.3.2.2). However, the Complete Pit Backfill Alternative would eliminate the potential for ground water accumulation -in the East Pit and the West Pit as described under the Proposed Action. The effects of the Complete Pit Backfill Alternative on surface water and ground water resources would be below the levels of significance.

4.3.3.2. Mitigation Measures

Measures to reduce the effects of the Complete Pit Backfill Alternative on surface water and ground water resources would be the same as those measures identified for the Proposed Action (see Section 4.1.3.1.3, Section 4.1.3.2.2, and Section 4.1.3.2.3). With implementation of the identified measures, the mitigated effects of the Complete Pit Backfill Alternative on surface water and ground water resources would be below the level of significance.

4.3.4. Air Resources

4.3.4.1. Impacts of the Complete Pit Backfill Alternative

The air resource impacts of the Complete Pit Backfill Alternative would be essentially identical to the air resource impacts generated by the Proposed Action, except that some of them (loading, hauling and dumping) would continue for a longer period of time (see Section 4.1.4.2). The impacts of the Complete Pit Backfill Alternative on air resources would be below the levels of significance.

4.3.4.2. Mitigation Measures

Measures to reduce the effects of the Complete Pit Backfill Alternative on air resources would be the same as those measures identified for the Proposed Action (see Section 4.1.4.3). With implementation of the identified measures, the mitigated effects of the Complete Pit Backfill Alternative on air resources would be below the level of significance.

4.3.5. Biological Resources

4.3.5.1. Impacts of the Complete Pit Backfill Alternative

The effects of the Complete Pit Backfill Alternative on biological resources would be essentially the same as those described for the Proposed Action (see Section 4.1.5.2 and Section 4.1.5.3). The Complete Pit Backfill Alternative would extend the on-site occupation and potential impacts to wildlife for up to an additional 5.25 years while backfilling operations are being conducted, but the Complete Backfill Alternative would eliminate the remnant East Pit and make this 261-acre area available to deer and other terrestrial wildlife species.

Following backfilling and site reclamation activities, fences would be removed and, after an indefinite period, the entire Project area would eventually return to desert wildlife habitat as natural revegetation and restoration processes evolve. Approximately 36 acres of microphyll woodland habitat originating from internal drainages within the Complete Backfill Alternative mine and process area would be lost and could not be restored by site reclamation activities.

4.3.5.2. Mitigation Measures

The measures to reduce the effects of the Complete Pit Backfill Alternative on biological resources would be the same as those measures identified for the Proposed Action (see Section 4.1.5.4). With implementation of the identified measures, the mitigated effects of the Complete Pit Backfill Alternative on biological resources would be below the level of significance.

4.3.6. Cultural and Paleontological Resources

4.3.6.1. Impacts of the Complete Pit Backfill Alternative

The Complete Pit Backfill Alternative would result in ~~literally~~ identical impacts on cultural resources to those created by the Proposed Action (see Section 4.1.6.2).

4.3.6.2. Mitigation Measures

Measures to reduce the effects of the Complete Pit Backfill Alternative on cultural and paleontological resources would be the same as those measures identified for the Proposed Action (see Section 4.1.6.3). However, as with the Proposed Action, until such time as the treatment plan is completed and accepted by the SHPO, it is not possible to determine the actual level of significance of the impacts to cultural resources.

4.3.7. Visual Resources

4.3.7.1. Impacts of the Complete Pit Backfill Alternative

The effects of the Complete Pit Backfill Alternative on visual resources would be similar ~~approximately equivalent~~ to those identified for the Proposed Action over the active life of the Project (see

Section 4.1.7.2). Human occupation and activities would be visually evident for up to an additional five plus (5+) years while backfilling operations were conducted. However, backfilling operations would reduce the size of the waste rock stockpiles and return more of the landscape to a topographic condition more similar to the pre-Project conditions than the Proposed Action. When viewed from Ogilby Road, the Complete Pit Backfill Alternative would look identical to the Proposed Action, since the leach pad and southwest end of the "south" waste rock stockpile, which are the major features visible from Ogilby Road, would not be changed from the Proposed Action (see Figure 4-2). The view of the Project mine and process area from Black Mountain and from the Picacho Peak Wilderness Area under the Complete Pit Backfill Alternative would be different from the Proposed Action because of the backfilling of the open pits and the substantial reduction of the size and extent of most of the waste rock stockpiles (see Figure 4-7 and Figure 4-8). However, the ~~The~~ effects of the Complete Pit Backfill Alternative on visual resources would still not meet the BLM Class II visual objectives for CDCA limited use areas and would thus be above the level of significance.

4.3.7.2. Mitigation Measures

Measures to reduce the effects of the Complete Pit Backfill Alternative on visual resources would be the same as those measures identified for the Proposed Action (see Section 4.1.7.3). However, with implementation of the identified measures, the mitigated effects of the Complete Pit Backfill Alternative on visual resources would remain inconsistent with BLM objectives for Class II visual areas, and the mitigated effects of the Complete Pit Backfill Alternative on visual resources would remain significant.

4.3.8. Noise

4.3.8.1. Impacts of the Complete Pit Backfill Alternative

Noise generated by the Complete Pit Backfill Alternative would be approximately the same as noise generated by the Proposed Action, and the effects of the noise generated on potential noise receptors would also be approximately the same as that described for the Proposed Action (see Section 4.1.8.2). However, backfilling operations would extend the period during which noise is generated in the Project area by up to approximately 5.25 years. The noise effects

Figure 4-7: Complete Pit Backfill Alternative - Projected View of the Project Mine and Process Area from Black Mountain (KOP #2)

Figure 4-8: Complete Pit Backfill Alternative - Projected View of the Project Mine and Process Area from a Hilltop Near Indian Pass in Picacho Wilderness (KOP #3)

of the Reduced Action Alternative would be below the levels of significance.

4.3.8.2. Mitigation Measures

Measures to reduce the noise effects of the Complete Pit Backfill Alternative would be the same as those measures identified for the Proposed Action (see Section 4.1.8.3). With implementation of the identified measures, the mitigated effects of the Complete Pit Backfill Alternative on noise would be below the level of significance.

4.3.9. Land Use

4.3.9.1. Impacts of the Complete Pit Backfill Alternative

Over the active life of the Project, the Complete Pit Backfill Alternative would have essentially equivalent effects on land use as those described for the Proposed Action (see Section 4.1.9.2). Backfilling operations would extend the period of time during which dispersed recreation and other uses in the vicinity would be excluded from the Project area or be indirectly affected. However, following completion of backfilling, the construction of the loose rock rubble barricade around the East Pit and Singer Pit areas would be unnecessary, and public access to the entire Project area would be possible. The effects of the Complete Pit Backfill Alternative on land use would be below the levels of significance.

4.3.9.2. Mitigation Measures

Measures to reduce the effects of the Complete Pit Backfill Alternative on land use would be the same as those measures identified for the Proposed Action (see Section 4.1.9.2). With implementation of the identified measures, the mitigated effects of the Complete Pit Backfill Alternative on land use would be below the level of significance.

4.3.10. Socioeconomics

4.3.10.1. Impacts of the Complete Pit Backfill Alternative

The Complete Pit Backfill Alternative would have the same positive socioeconomic effects as the Proposed Action over the life of the mining operations (see Section 4.1.10.2). In addition, a somewhat smaller staff of workers would be employed or contracted for the up to 5.25-year period needed to complete the backfilling operations. Additional purchases of fuel, replacement equipment and maintenance, and other goods and services would be required over the life of the backfilling operation. Chemgold estimates that the total additional cost of completely backfilling the East Pit would be approximately $~~136~~ 77 million (assuming approximately $~~0.55~~ 0.46 per ton of material moved).

4.3.10.2. Mitigation Measures

No measures are required to reduce the effects of the Complete Pit Backfill Alternative on socioeconomics.

4.3.11. Roads~~, Utilities~~ and Public Services

4.3.11.1. Impacts of the Complete Pit Backfill Alternative

The Complete Pit Backfill Alternative would have approximately the same effects on roads, utilities, and public services as would the Proposed Action (see Section 4.1.11.1.2, Section 4.1.11.2.2, and Section 4.1.11.3.2). However, the access roads to the Project area would continue to be utilized during the up to 5.25-year period needed to backfill the pits. The effects of the Complete Pit Backfill Alternative on roads, utilities, and public services would be below the levels of significance.

4.3.11.2. Mitigation Measures

Measures to reduce the effects of the Complete Pit Backfill Alternative on roads, utilities, and public services would be the same as those measures identified for the Proposed Action (see Section 4.1.11.1.3, Section 4.1.11.2.3, and Section 4.1.11.3.3). With implementation of the identified measures, the mitigated effects of the

Complete Pit Backfill Alternative on roads, utilities and public services would be below the level of significance.

4.3.12. Emergency Services and Public Safety

4.3.12.1. Impacts of the Complete Pit Backfill Alternative

Over its active life, the Complete Pit Backfill Alternative would have approximately the same effects on emergency services and public safety as would the Proposed Action (see Section 4.1.12.2). The Complete Pit Backfill Alternative would result in the backfilling of all of the pits within the Project area and would, thereby, eliminate the potential public safety hazard associated with the East Pit. The effects of the Complete Pit Backfill Alternative on emergency services and public safety would be below the levels of significance.

4.3.12.2. Mitigation Measures

Except for the unnecessary measures to fence the Project area and restrict access after the completion of backfilling and site reclamation operations, the measures to reduce the effects of the Complete Pit Backfill Alternative on emergency services and public safety would be the same as those measures identified for the Proposed Action (see Section 4.1.12.3). With implementation of the identified measures, the mitigated effects of the Complete Pit Backfill Alternative on emergency services and public safety would be below the level of significance.

4.4. No Action Alternative

Under the No Action Alternative, the Project would not be constructed and precious metals within the Project area not be mined. As discussed in Section 2.2.3, if the No Action Alternative is adopted, the Project area would remain as it currently is, and existing dispersed recreational uses of the area would continue.

4.4.1. Geology and Mineral Resources

No adverse impacts on geology or mineral resources would result from the No Action Alternative. The disapproval of the Project could discourage future proposals for mining of, and/or maintaining claims for, the precious mineral resources within the Project area.

4.4.2. Soil Resources

No adverse impacts on soil resources in the Project area would result from the No Action Alternative.

4.4.3. Hydrologic Resources

No adverse impacts on surface water or ground water resources in the Project area would result from the No Action Alternative.

4.4.4. Air Resources

No adverse impacts on air resources within, or in the vicinity of, the Project area would result from the No Action Alternative.

4.4.5. Biological Resources

No adverse impacts on biological resources within, or in the vicinity of, the Project area would result from the No Action Alternative.

4.4.6. Cultural and Paleontological Resources

No adverse impacts on cultural or paleontological resources within, or in the vicinity of, the Project area would result from the No Action Alternative.

4.4.7. Visual Resources

No adverse impacts on visual resources would result from the No Action Alternative.

4.4.8. Noise

No adverse noise impacts would result from the No Action Alternative.

4.4.9. Land Use

With the probable exception of the discontinuance of mining exploration activities, the existing land use within, and in the vicinity of, the Project area would be unaffected by the No Action Alternative.

4.4.10. Socioeconomics

The No Action Alternative would not create the 100 job opportunities, nor the estimated $5.93 million in annual payroll, from the Project. The No Action Alternative would also result in the loss of the $48 million initial capital expenditures, $1.7 million annual capital expenditures, and the $26 million per year non-capital expenditures and associated taxes and benefits to the local economy projected by the Project.

4.4.11. Roads~~, Utilities~~ and Public Services

No adverse impacts on roads, utilities, or public services within, or in the vicinity of, the Project area would result from the No Action Alternative.

4.4.12. Emergency Services and Public Safety

No adverse impacts on emergency services or public safety provided to, or in the vicinity of, the Project area would result from the No Action Alternative.

5. CUMULATIVE EFFECTS

5.1. Introduction

As required under NEPA and CEQA, this chapter addresses the potential for significant cumulative environmental effects on the environmental resources in the surrounding area which could result from the implementation of the Proposed Action and other reasonably foreseeable future projects in the general vicinity of the Project. Cumulative impacts are defined under federal regulations as:

> "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individual minor but collectively significant actions taken place over a period of time" (40 CFR 1508.7).

The State of California CEQA guidelines define cumulative impacts as:

> "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts. The individual effects may be changes resulting from a single project or a number of separate projects. The cumulative impact from several projects is the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time" (14 CCR 15355).

The geographical area considered for the analysis of cumulative effects may vary in size and shape to reflect each environmental resource which is evaluated. For this cumulative impact analysis, the potentially affected resources are located in a study area which is generally bounded by the Colorado River to the east; the Chocolate Mountains to the northeast; the Algodones Sand Dunes/East Mesa to the west; and the Mexican border to the south (see Figure 5-1).

Environmental consequences of the Proposed Action were evaluated in Chapter 4 for the various environmental resources. Based upon the scoping conducted for the Project, and the analysis of the environmental resources conducted in Chapter 4, only hydrologic resources, air resources, biological (wildlife) resources, cultural resources, and visual resources are considered to have the potential to be

Figure 5-1: Locations of the Projects Considered in the Cumulative Impacts Analysis

cumulatively impacted by existing and proposed developments within the identified cumulative impacts study area (see Section 5.2).

Project-specific impacts to the other resources evaluated in Chapter 4 may also occur as a result of the other reasonably foreseeable projects, but these impacts would not be cumulatively significant. The potentially significant cumulative effects to these identified resources from the reasonably foreseeable future scenario are provided in Section 5.3.

5.2. Existing, Proposed and Reasonably Foreseeable Activities in the Area of Cumulative Analysis

The individual projects described below comprise the existing and reasonably foreseeable future projects identified by Imperial County and the BLM, El Centro Resource Area. These projects and uses include mining uses, commercial uses, water conservation projects, military uses, and recreational uses. All of these projects and uses have the potential to impact the environmental resources of concern within the area of the cumulative impacts analysis. The reasonably foreseeable future analysis for this EIS/EIR was evaluated for a 20-year time frame based on the estimated potential future life of the Project.

5.2.1. Mining Uses

5.2.1.1. American Girl Mine Project

The following description of the American Girl Mine Project was obtained from the Draft EIS/EIR which was prepared on behalf of the U.S. Bureau of Land Management by P.M. DeDycker and Associates (BLM, 1994b).

The American Girl Mine Project consisted of two (2) adjacent operating components, the Padre Madre operation and the American Girl Canyon operation (see Figure 5-1). The American Girl Canyon and Padre Madre operations were scheduled to cease mining operations in 1994, although operations continue into 1996. A third component, the Oro Cruz operation of the American Girl Mine Project, began operations in late 1995 and was projected to ~~was scheduled to begin operations in 1994 and~~ cease mining operations by ~~1997~~ 1999. Reclamation and post-mining closure activities at the American Girl Mine Project were expected to last until mid-~~1999~~ 2001. In addition, construction has commenced on the relining of an existing heap leach pad from which the leached ore has been removed to allow the pad to

be reused for processing of additional ore (Personal Communication - ~~Jessie~~ Jesse Soriano, Imperial County Planning/Building Department, 1996).

The Padre Madre operation involved the annual mining and heap leaching of approximately 200,000 tons of ore, and the annual mining and stockpiling of approximately 400,000 tons of waste rock. Cumulative totals of 3.5 million tons of ore and 12.5 million tons of waste rock were authorized. The American Girl Canyon operation was authorized to extract 8.5 million tons of surface- and underground-mined ore, and excavate and stockpile 17 million tons of waste rock. The cumulative total surface disturbance for both of these operations was estimated to be 618 acres.—

As proposed, mining activities associated with the Oro Cruz operation (pits, waste dumps, haul roads, etc.) would directly disturb an estimated 191 acres. Ore processing and milling would be conducted at the existing American Girl Canyon facility. Surface mining at the Oro Cruz operation would cumulatively produce approximately 2.5 million tons of ore and 8.5 million tons of waste rock at maximum yearly rates of approximately 1.2 million tons of ore and 3.5 million tons of waste rock. During this same time underground mining would produce approximately 65,000 tons of waste rock and 500,000 tons of ore, at a maximum rate of approximately 250,000 tons of ore per year.

Water required for mining, milling and heap leach processing was to be supplied from ground water produced from the American Girl well southwest of American Girl Canyon. The maximum yearly consumptive use for the Oro Cruz operation was not expected to exceed 300 acre-feet.

5.2.1.2. Mesquite Mine

The Mesquite Mine and associated facilities occupy a total of approximately 5,200 acres of land east of Glamis (Environmental Solutions, Inc., 1987) (see Figure 5-1). Approximately 3,100 acres of the total project area are public lands managed by the BLM. Approximately 4,000 acres of the 5,200-acre Project area have been, or would eventually be, disturbed by the mining activities. Disturbed areas would include approximately ten (10) overburden stockpiles, which would be used to dispose of approximately 350 million tons of

waste rock. These overburden piles are projected to reach heights of about 280 feet above the existing ground surface. Other disturbed areas include the four (4) open pits, the approximately 1,000 acres of lined heap leach pads, mine access roads, utility infrastructure, and other ancillary facilities (Environmental Solutions, Inc., 1987).

The Mesquite Mine, which began operating in 1985, is currently operating at approximately 85 percent of its authorized capacity. Mining activities are expected to operate at this level up until 1997. After 1997, mining activities are expected to gradually decline, with operations scheduled to discontinue sometime within the next 9 to 14 years (by the year 2008); market conditions would ultimately determine the actual closure date (Environmental Solutions, Inc., 1987).

The Mesquite Mine would extract a total of approximately 440 million tons of gold-bearing ore and barren rock from four (4) open pits by the anticipated closure within the next 9 to 14 years of active mine life.

Water consumption is expected to be approximately 1,000 afy (BLM, 1995a). Water is supplied by a system consisting of three (3), 2,500-gpm capacity water wells located approximately three (3) miles south of the mine (Environmental Solutions, Inc., 1993a).

5.2.1.3. Picacho Mine

The following description of the Picacho Mine operation was obtained from personal communications with Chemgold, Inc. (~~C.K. McArthur,~~Personal Communication - C.K. McArthur, Chemgold, Inc., 1995).

Chemgold, Inc. operates the Picacho Mine, which is located in easternmost Imperial County, California, approximately eighteen (18) miles north of Yuma, Arizona (see Figure 5-1). The Picacho Mine property consists of 600 acres of fee lands and 1,650 acres of unpatented lode mining claims. The total disturbed area at the Picacho Mine amounts to approximately 330 acres.

Since 1980, open-pit, run-of-mine, heap leach gold mining and processing has occurred at the Picacho Mine. Four (4) open pit deposits have been developed, with current total annual mining

averaging approximately 1.5 million tons of ore and 7.0 million tons of waste. Development of an additional 3.6 million tons of ore reserves is now underway, which is projected to be the final phase of mining at Picacho. The completed pits and heaps are currently undergoing reclamation. Mining is expected to terminate in 1998, with processing and reclamation activities scheduled to continue until 2001.

Water for mining and processing operations is supplied by pipeline to the mine from a shallow well located adjacent to, and which is assumed to produce water recharged from, the Colorado River river aquifer. Water from the Colorado River is used through a present-perfected water right to 115 afy of water held by the property and verified by contract with the U.S. Bureau of Reclamation. The Picacho Mine uses the entire annual 115 afy allocation of water from the Colorado River river aquifer. No local ground water is used at the Picacho Mine due to the lack of a sufficient aquifer in this location.

5.2.1.4. Mineral Exploration

Mineral exploration activities are ongoing to some extent within the boundaries of each of the mines within the cumulative impacts study area. However, these activities would not substantially impact the resources of concern because they have already been accounted for in the impacts resulting from the mine operations themselves.

5.2.2. Commercial Uses

5.2.2.1. Mesquite Regional Landfill

The Mesquite Regional Landfill is a proposed new regional Class III sanitary landfill, to be located in Imperial County adjacent to the existing Mesquite Mine (BLM, 1995a) (see Section 5.2.1.2). The landfill would accommodate up to a total of 600 million tons of municipal solid waste residue and would have a life span of approximately 100 years. The municipal solid waste residue would be transported to the landfill from various Southern California communities via the existing Southern Pacific Transportation Company main line rail track and a short new railroad spur extending from the main line rail track to the landfill site. The landfill would be constructed on land currently managed by the BLM which would be exchanged for other land in the Santa Rosa Mountains Natural Scenic Area and near the Chuckwalla Bench ACEC. The landfill property

covers approximately 4,245 acres, although the actual landfill footprint is expected to occupy approximately 2,290 acres. Approximately 588 acres of the landfill site has been extensively disturbed by previous on-site activities, and vegetation over an area of approximately 3,657 acres would be disturbed.

The proposed landfill anticipates the use of water supplied from the existing Mesquite Mine ground water well field, located approximately one (1) mile south of the landfill site. The three (3) wells each have estimated maximum yields of 2,500 gallons per minute (gpm). The average annual water usage associated with the landfill operations is expected to be less than 1,000 acre-feet per year.

5.2.2.2. Gold Rock Ranch

The following description of the Gold Rock Ranch was provided by the BLM (Personal Communication - A. Schoeck, BLM, 1995). Gold Rock Ranch is ~~an approximately 20 acre,~~ privately-owned area that, until recently, was owned by a single family. Gold Rock Ranch is located approximately seven (7) miles southwest of the Project mine and process area.

Gold Rock Ranch is used as an RV park/campground and can accommodate about 20 campers. Water and electrical hookups are available. A small country store is also located on the site. Primary usage is during the winter months, when an average of 3,000 visitors and campers attend the annual "Rockhound Roundup." This event lasts for between 5 ~~to~~ and 10 days around Thanksgiving.

An on-site well is used to supply domestic water for Gold Rock Ranch. Current average usage is estimated at 5,000 gpd (less than 6 afy), with an estimated historic maximum usage rate of 12,000 gpd (less than 14 afy), as estimated by the owner (BLM, 1994b). Surface disturbance associated with Gold Rock Ranch is estimated at 20 acres.

5.2.2.3. Agricultural Projects

Citrus Heights Ranches received a Conditional Use Permit (CUP) from Imperial County which allows for the reactivation and operation of three (3) water wells on approximately 475 acres of land in Section 8, Township 16, Range 21 East, SBB&M. The site is

located approximately two (2) miles east of the intersection of Ogilby Road and Interstate 8 (Imperial County Planning Commission, 1995).

Citrus Heights plans to pump 1,600 acre-feet of ground water per year in order to grow citrus trees. The existing site is fallow farm land, which was previously used to grow jojoba. Other than the improvements to the three (3) wells, the only other new improvements would be for the installation of irrigation systems (Imperial County Planning Commission, 1995).

5.2.3. Water Conservation Projects

5.2.3.1. Metropolitan Water District All American Canal Lining Project

The following description of the Metropolitan Water District All American Canal Lining Project was obtained from the Final EIS/EIR for this project (U.S, Bureau of Reclamation, 1994).

The Metropolitan Water District (MWD) of Southern California is proposing to line a 29.9-mile section of the existing, unlined All American Canal beginning just south of Pilot Knob and ending at the Imperial Irrigation District's (IID's) Drop 4, where the canal enters the irrigated area of the Imperial Valley in Imperial County, California. The project would begin about six (6) miles west of Yuma, Arizona, and end about sixteen (16) miles east of El Centro and Calexico, California. The purpose of the project is to conserve up to 67,700 acre-feet of the estimated 91,000 acre-feet per year of water currently being lost through seepage from the unlined canal.

Construction of the project would result in the emissions of PM_{10}, although dust from excavation and grading operations would be localized and controlled by sprinkling access roads and exposed areas with water. Implementation of this project would also reduce ground water recharge to the Amos-Ogilby-East Mesa ground water basin by up to an estimated 67,700 acre-feet per year, which would reduce or eliminate the wetland vegetation, and wetland habitat-dependent wildlife, which has developed from this leaking water along the adjacent unlined portion of the canal. However, plans for construction of this canal lining project have been suspended and there is no schedule for implementation (Personal Communication - Michael Walker, U.S. Bureau of Reclamation, 1996).

5.2.3.2. U.S. Bureau of Reclamation East Mesa Recharge Demonstration Recovery Project

The following description of the U.S. Bureau of Reclamation (USBR) East Mesa Recharge Demonstration Recovery Project (East Mesa Recharge Project) was obtained from Final EIS/EIR for the proposed Mesquite Regional Landfill (BLM, 1995a).

The East Mesa Recharge Project involves the development of a recharge/recovery operation in the vicinity of the All American Canal at the Coachella Canal branch to demonstrate the feasibility and economics of recovering water lost from the unlined canal. The proposal involves the installation of four (4), 16-inch diameter pilot demonstration wells, each to be dug within the recharge area to a depth of approximately 70 feet along the west side of the old, unlined Coachella Canal. Water recovered from the wells would be diverted to the lined canal to the east through an 8-inch diameter pipe. The USBR intends on conducting the recovery test by pumping 1,000 acre-feet of water from the East Mesa recharge basin over a one (1)-year period. Approximately an equivalent volume of water would be recharged to the area from the unlined canal, thereby resulting in no net loss of ground water in the East Mesa Basin during the test. If the recharge and recovery process proves successful, the USBR has indicated that the project could be made permanent, but the potential for long-term recharge and recovery pumping is uncertain and beyond the scope of this cumulative impact assessment.

5.2.4. Military Uses

5.2.4.1. Chocolate Mountain Aerial Gunnery Range

The U.S. Marine Corps (USMC) maintains the Chocolate Mountain Aerial Gunnery Range (CMAGR) which, at its closest, is approximately ten (10) miles northwest of the Project area, immediately north of the Mesquite Mine and State Route 78 (SR 78). The CMAGR is actively used by various branches of the U.S. Armed Forces for military aircraft training and testing and for live ordnance delivery practice (BLM, 1995a).

The activities associated with the CMAGR substantially increase ambient noise levels in the area during the activities (BLM, 1995a). The resulting increase in noise levels disrupts and alters sensitive

wildlife species and their migratory patterns for intermittent short-term, and possibly long-term, periods. Low-level military overflights and ordnance explosions also contribute to airborne dust generation and some loss of vegetation and wildlife habitat.

5.2.4.2. Other Military Uses

The USMC conducts both daytime and nighttime helicopter flight training on public lands in and around the Project area and vicinity (~~T. Manfredi,~~ Personal Communication - T. Manfredi, USMC, June 2, 1995). These training exercises are conducted at low-levels, sometimes including touch downs. The nighttime training includes the use of night vision goggles (NVG) and other night vision devices (NVD). This activity can increase ambient noise levels, increase airborne dust generation, and disturb both wildlife and recreational users (campers, etc.).

Two (2) military Visual Flight Rule (VFR), low-level flying routes for fixed wing aircraft are also located in the vicinity of the Project area and cumulative impact study area (~~T. Manfredi,~~ Personal Communication - T. Manfredi, USMC, June 2, 1995). VFR-299 (445th Military Airlift Wing-March Air Force Base) and VFR-1266 (Marine Air Group-13-MCAS Yuma) each consist of six (6) ±-mile wide flight corridors which are used by fixed-wing military aircraft during training or travel. Aircraft use of the VFR corridors through the cumulative impacts study area has the potential to also increase ambient noise levels, increase airborne dust generation, and disturb both wildlife and recreational users, although to a lesser extent than the low-level helicopter use.

5.2.5. Recreational Uses

Dispersed recreational activities, including off-road and off-highway vehicle (ORV and OHV) uses, hunting, and camping, are conducted in the cumulative impacts study area. These activities have the continuing potential to adversely impact environmental resources within the described cumulative impacts study area.

ORV/OHV, hunting, and camping activities can impact air quality by increasing airborne dust generation from soils and pollutant emissions. These activities also place increased pressure on wildlife and have the potential for long-term and potentially severe impact on wildlife habitat. Dispersed

recreational activities can also be a significant contributing factor in the destruction of cultural resources.

5.3. Evaluation of Potential Cumulative Impacts and Mitigation

5.3.1. Hydrologic Resources (Ground Water)

The existing ground water in storage in the Amos-Ogilby-East Mesa Basin has been estimated at 229 million acre-feet, and the amount of recharge to the basin has been estimated to be 100,000 afy, predominantly from leakage from the unlined section of the All American Canal (Environmental Solutions; 1993a). The cumulative maximum total of annual ground water consumption from the basin by the relevant identified cumulative projects, including the Proposed Action, totals approximately 5,106 afy. Figure 5-2 presents a graph of the annual gross recharge to the basin, the annual consumption by applicable projects, and the resulting net recharge to the basin, for each year from 1997 through the year 2016. As shown, the annual consumption of ground water by all of these wells together is a small percentage (maximum of approximately five (5) percent) of the gross estimated recharge to the basin. The MWD All American Canal Lining Project, if constructed, would result in an estimated reduction in recharge from the canal of two-thirds (2/3), or 67,700 afy, much of which would be recharged lost to the Amos-Ogilby-East Mesa Basin. However, even with this reduction, the net recharge to the basin from the All American Canal alone even after lining would still far exceed the cumulative ground water consumption from the identified projects and uses. As stated in Section 5.2.3.1, this project is currently on hold and has no schedule for implementation.

The maximum total estimated cumulative annual consumption of ground water by the cumulative projects within the basin also represents approximately 0.002 percent of the ground water currently estimated stored in the basin. Based upon ground water drawdown estimates provided for the Project wells alone (see Section 4.1.3.2.2), and because these cumulative projects are widely scattered and the ground water consumption distributed, there should be no significant interference between the projects from their individual uses of the ground water resources. No mitigation measures are recommended.

5.3.2. Air Resources (Air Quality)

The identified individual cumulative study area projects each emit air pollutants. However, consistent with the rest of Imperial County, fugitive PM_{10} is the air pollutant emitted in the largest quantity. However, fugitive

Figure 5-2: Cumulative Ground Water Consumption and Recharge from the Amos-Ogilby-East Mesa Basin

PM_{10} emissions do not produce substantial ambient air concentrations at great distances from the source, and the project areas are each located at relatively great distances (approximately five to ten (5-10) miles) from the next nearest project or concentrated use area. This, together with the recently adopted County-wide requirement for the implementation of RACM for the reduction of fugitive PM_{10} emissions and the typical project-specific mitigation measures, indicates that the identified projects are not expected to result in a significant cumulative air quality impact.

5.3.3. Biological Resources

Plant and wildlife habitat will be adversely impacted by the cumulative effects of the identified projects. Surface disturbance within the respective project areas will result in a direct loss of the habitat impacted. In addition, the quality of habitat in neighboring areas will be indirectly impacted by project noise, surface disturbance, dust, and other off-site intrusions. Direct impacts are semi-quantifiable in terms of habitat loss, but indirect biological impacts are much more difficult to assess as they vary with site-specific conditions and the sensitivity of the species which occur in the respective habitat types impacted. A distinction can also be made between the cumulative temporary losses of habitat that is removed over the active life of project activities but can be reclaimed after project activities have been completed, and permanent losses of habitat that remain indefinitely at the end of project activities and after the respective project sites are closed. Both direct and indirect, and temporary and permanent, cumulative impacts result from the existing and reasonably foreseeable projects identified.

As discussed in Section 3.5, multiple species of plants and wildlife were observed within the Project area or are known or suspected to occur within the areas of one or more of the multiple projects evaluated by this cumulative impact assessment. Special-interest species (i.e., listed species, USFWS special status species, BLM sensitive species, etc.) which are known or suspected to be "resident" species in one or more of the project areas include: cheeseweed owlfly, flat-tailed horned lizard (suspected to occur only in the Gold Rock Ranch project area due to its proximity to sand sheets extending east from the Algodones Dunes), chuckwalla, desert tortoise, loggerhead shrike, crissal thrasher, black-tailed gnatcatcher, and long-eared owl. A cumulative incremental loss of primary, breeding or nesting habitat for these species results from the projects.

Special-interest species which may make "permanent" use of one or more of the project areas for varied uses (i.e., foraging, roosting or resting)

include: desert bighorn sheep, Yuma puma/mountain lion, American badger, burrowing owl, prairie falcon, barn owl, California leaf-nosed bat, greater western mastiff bat, spotted bat, Townsend's big-eared bat, Yuma myotis, cave myotis, small-footed myotis, occult little brown bat, and desert pallid bat. A cumulative incremental loss of foraging, roosting, resting, or other limited habitat use results from the projects for these species.

Special-interest species which may make "occasional" use of one or more of the project areas as migrant or seasonal foraging or resting areas, primarily in the winter months, include: northern harrier, sharp-shinned hawk, peregrine falcon, golden eagle, ferruginous hawk, Cooper's hawk, gila woodpecker, and Vaux's swift. An incremental loss of seasonal or transient habitat for these species results from the projects.

Many other wildlife species are also known to use one or more of the project areas for resident, permanent, and occasional uses (see Section 3.5.6). Notable among these species is mule deer, which is a permanent resident species, and other game species such as Gambel's quail, mourning dove, and white-winged dove. Other common mammals include: antelope ground squirrel, Merriam kangaroo rat, desert woodrat, black-tailed jackrabbit, kit fox, coyote, and wild burro. A cumulative incremental loss of habitat results for these and other permanent, resident, or migrant species which use one or more of the project areas. Similarly, a cumulative incremental loss of habitat results for both sensitive plant species and common plants which occur in the areas disturbed by one or more of the identified projects.

The cumulative surface disturbance from the identified mine projects would total approximately ~~6,539~~ 6,552 acres. The approximate areas of surface disturbance from the other identified projects and non-dispersed activity areas include the Mesquite Regional Landfill (3,657 acres), Gold Rock Ranch (20 acres), and Citrus Heights (475 acres). Thus, the combined concentrated areas of surface disturbance total approximately ~~10,673~~ 10,686 acres of potential desert vegetation and wildlife habitat that is or would be unavailable over the respective lives of these projects. However, the individual projects are dispersed over a regional area at least 20 miles long by 15 miles wide (approximately 300 square miles, or nearly 200,000 acres) in which large vacant tracts of land, with similar vegetation and wildlife habitat, remain.

Dispersed recreation and military uses of the area put added pressure on wildlife species, in particular on game species and on wildlife intolerant of human activities. Dispersed recreation and military uses of the area also

adversely impacts vegetation and habitat over wide, unconcentrated areas. However, most of these dispersed activities are intermittent and/or temporary, and except for small, localized areas of concentrated or recurrent use (e.g., campsites or OHV/ORV use areas), both vegetation and wildlife can typically tolerate the level of these activities.

Concern exists over the continuing loss of habitat, in particular the loss of microphyll woodland habitat which exists in the desert washes that intersect much of this general area. Because of the limited forage and cover available in the alluvial flats and uplands between the wash systems, the microphyll woodland is necessary for the success of many species which occur in the area. Microphyll woodland is considered important by the CDFG and a necessary component of the ecosystem for the continuing success of deer and other sensitive species which utilize the habitat. Based on ~~available~~ aerial photographs of the general area made available by Chemgold, it is roughly estimated that approximately 4-8 percent (i.e., about 7,680-15,360 acres) of the 300 square miles evaluated in this cumulative impact analysis may be microphyll woodland. Assuming that, on average, a ~~similar~~ comparable proportion (i.e., 4-8 percent) of the microphyll woodland habitat is directly impacted by surface disturbance within the areas of the combined projects, then a total of approximately 427-~~854~~ 855 acres of microphyll woodland has been or will be lost within the regional area evaluated over the combined lives of these projects. Insufficient information is available to make a cumulative assessment of the indirect impacts resulting from the identified projects or to distinguish between the temporary loss of habitat occurring over the life of the respective projects and the permanent loss of habitat after the respective projects have been closed.

Individual projects are required to implement measures to mitigate impacts on desert tortoise and other listed or sensitive plant and animal species, which reduces the potential for both individual and cumulative impacts to wildlife. With the dispersed nature of the projects and the implementation of the project-specific mitigation measures, the cumulative effects of the identified projects and uses on biological resources will be below the levels of significance.

5.3.4. Cultural Resources

Important cultural resources may exist in each of the identified cumulative project areas. Project-specific mitigation measures have and will be required to reduce the effects of the respective projects on cultural resources, generally to below the level of significance. Because of the large

distances between each of the located projects, and the relatively small percentage of the cumulative effects area which is subject to disturbance, no cumulative effects on individual cultural resources or resource assemblages would be expected. Recreation and military uses may result in adverse impacts on known or unidentified cultural resources over widely dispersed areas. However, the identified projects should not concentrate the otherwise dispersed recreational or military uses of the cumulative impact area such that a new or cumulative effect on cultural resources will result. As such, the cumulative effects of the identified projects and uses will be below the level of significance.

5.3.5. Visual Resources

Each of the identified projects are located, at least in part, on or adjacent to public lands administered by the BLM within the CDCA. Each of the projects is located within or adjacent to CDCA-designated limited- or moderate-use areas with BLM visual resource management objectives to retain or partially retain the existing character of the landscape. To the extent that these projects do not individually meet the respective visual resource objectives, they may individually have a significant effect on visual resources. However, except for the immediately adjacent Mesquite Mine and Mesquite Regional Landfill, no more than one of the projects are visible from any important viewing location within the cumulative impact study area. Because there is no cumulative increase or combined visual impact from the multiple projects, the cumulative effects of the projects on visual resources will be below the level of significance.

5.3.6. Noise

The individual projects generate noise which will be audible outside the respective project areas. However, the respective project areas are each located at great enough distances (approximately five to ten (5-10) miles) from the next nearest project or concentrated use that although particularly loud noises (such as blasting) may be audible between project areas, the sound levels would not typically be intrusive. With the implementation of typical project-specific mitigation measures, the identified projects are not expected to result in a significant cumulative noise impact.

6. OTHER REQUIRED CONSIDERATIONS

6.1. Relationship Between Local Short-Term Use of the Environment and the Maintenance and Enhancement of Long-Term Productivity

The principal existing land uses in the Project area are mineral exploration, outdoor recreation, and wildlife habitat. Implementation of the Proposed Action would commit approximately ~~1,648~~ 1,625 acres towards a single land use for the anticipated twenty (20)-year+ operational lifespan for the Project. Under the Proposed Action, approximately ~~1,612~~ 1,589 acres within the Project mine and process area would be completely fenced for security purposes. Wildlife would be precluded from accessing these areas during the operational life of the Project, as would recreational users.

Upon completion of mining activities, the Project area would be reclaimed and a majority of the existing land uses within the Project area could be re-established. However, the projected period before natural conditions return to an approximate pre-Project status is expected to exceed several decades following completion of the active life of the Project. The 227-acre East Pit and 34-acre Singer Pit would not be backfilled to the surface and would be reclaimed only to a level that would minimize potential risk to health and safety. Original wildlife habitat, or recreational land uses, would not be re-established in the East Pit and Singer Pit areas, although the pits would remain accessible for future mineral exploration and development and for selective wildlife habitat.

The Proposed Action would generate net socioeconomic benefits for the local and regional economy over the anticipated twenty (20) years of operation, and during the additional years until the completion of reclamation beyond the closure of mining and process operations. Approximately 50 to 100 construction workers, and 100 full-time workers, would be employed by the Project at various times. Total annual payroll for the 100 full-time employees would be approximately $ 5.93 million. Approximately $48 million in capital would be expended for the Project during 1997. Sales tax on these capital expenditures would amount to approximately $3.72 million. For each year thereafter, average annual capital expenditures would amount to approximately $1.7 million, yielding approximately $0.13 million per year in additional sales tax.

Annual non-capital expenditures are estimated to total $26 million. Property taxes in Imperial County are assessed at approximately 1.1 percent per year of the total assessed value. Depending on the assessed valuation of the Project property, projected property taxes are estimated to range between $250,000 and $600,000 per year. The development of mineral resources is in the national interest to satisfy

industrial and security needs. In providing these benefits, the Project would not preclude the long-term use of a majority of the Project area for other land uses.

6.2. Significant Irreversible and Irretrievable Resource Commitments

The topography of the Project mine and process area would be permanently altered by the waste rock stockpiles, heap, and the open East Pit and Singer Pit. This would also irreversibly alter the visual character of the Project mine and process area. The land comprising the Project mine and process area would be irreversibly altered through the excavation of the open pits and the creation of the waste rock stockpiles and heap. Following the completion of reclamation, much of the Project area would be able to support land uses similar to those which existed prior to the Project, although the changes would represent an irreversible commitment to the new landforms.

The extracted ground water and mineral resources represent irretrievable commitments of these local resources to the development of the Project. In addition, all of the energy, fuels, and other materials (such as processing chemicals) imported to the Project site which are consumed represent irreversible and irretrievable commitments of resources to the Project.

6.3. Growth-Inducing Effects

The Project would produce few, if any, growth inducing effects. Since the new 92 kV transmission line into the Project mine and process area would be removed following the completion of the Project, the Project would not produce, or require, the extension or expansion of any utilities or public services into the area which would remain to attract or stimulate subsequent developments. Project employment would not be of a size which would stimulate the development of additional growth of housing, schools, or other supporting infrastructure in either Imperial County, California or Yuma County, Arizona. Project expenditures, while substantial, would be spread between California, Arizona and other states, such that no significant economic stimulus to any individual economy would occur.

7. COORDINATION AND CONSULTATION

Several opportunities for coordination and consultation with agencies and the public were provided by the BLM and ICPBD at an early stage in the preparation of this EIS/EIR. The BLM published a Notice of Intent (NOI) to prepare an EIS in the Federal Register on March 24, 1995. A Notice of Preparation (NOP) of an EIR was distributed by Imperial County on April 5, 1995. Two (2) public scoping meetings were also held to receive public comments, identify concerns, and evaluate viable alternatives. Notices of these public hearings were distributed to approximately 200 news organizations by the BLM. A total of approximately 30 attended these meetings, including eleven (11) members of the public, and a total of sixteen (16) comment letters were received which addressed both specific and general issues regarding the Project. The comments received were used in the development of the scope and content of this EIS/EIR.

Copies of all of the notification documents, and comments received, are included in this EIS/EIR in Appendix ~~A~~ B. Additional information regarding the scoping process is presented in Section 1.5 of this EIS/EIR.

Specific additional consultations are being undertaken by the BLM with the USFWS pursuant to Section 7 of the federal Endangered Species Act (see Section 3.5.2) and the SHPO pursuant to Section 106 of the National Historic Preservation Act of 1966 (see Section 4.1.6.1), and by the ICPBD with the CDFG pursuant to the California Endangered Species Act (see Section 3.5.3).

In addition, the American Indian Religious Freedom Act (AIRFA) and the Executive Order of April 24, 1995 requires that local Native American groups be consulted regarding any proposed projects which may affect traditional religious practices, and the BLM has issued internal guidelines which instruct that this consultation should be initiated early in the project review or decision-making process, and be conducted at the highest levels within the BLM jurisdiction responsible for the decision. BLM has initiated this consultation process with the Quechan Tribe ~~Nation~~ regarding the Project, and Quechan Tribe ~~Nation~~ has requested that members be involved in study and development of the treatment plan for the Project. The consultation process is also ongoing as of the publication date of this EIS/EIR.

8. LIST OF PREPARERS

This Environmental Impact Statement/Environmental Impact Report (EIS/EIR) was prepared by the Bureau of Land Management, El Centro Resource Area Office (BLM-ECRA), and the Imperial County Planning ~~and~~ /Building Department (ICPBD). Agency staff which participated in the preparation of this EIS/EIR included:

Bureau of Land Management, El Centro Resource Area

Terry Reed, Area Manager
G. Ben Koski, Area Manager (retired)
Thomas Zale, Chief of Resources
Keith Shone, Environmental Coordinator
Pat Weller, Archaeologist
Arnold Schoeck, Recreation Specialist
Tim Finger, Wilderness Specialist
~~Christine Williams, Restoration Ecologist~~
Don Simon, Law Enforcement Ranger
Larry Caffey, Surface Compliance Specialist
Lynda Kastoll, Realty Specialist
Linda Self, Realty Specialist
Nancy Nicolai, Wildlife Biologist
Camille Forest, Geologist
Bob Bower, Recreation Specialist

Imperial County Planning ~~and~~ /Building Department (ICPBD):

Jurg Heuberger, Planning Director
Jesse Soriano, Planner III
~~Richard Cabanilla, Planner III~~
~~Kent Hector, Planner II~~

The BLM-ECRA and ICPBD were assisted in the preparation of this EIS/EIR by Environmental Management Associates, Inc. (EMA). EMA staff, their responsibilities for preparation of the EIS/EIR, and professional qualifications, are listed below:

Environmental Management Associates, Inc.

Dwight L. Carey, Principal: Principal-in-Charge and Project Manager; EIS/EIR preparation, Alternatives, Air Quality, ~~,~~Cultural Resources
D.Env. Environmental Science and Engineering, 1982, University of California, Los Angeles
M.S. Geology, 1976, University of California, Los Angeles
B.S. Geology, 1972, California Institute of Technology
20 years experience

Richard F. DeLong, Principal Specialist: Deputy Project Manager; EIS/EIR preparation, Alternatives, Visual Resources
M.S. Geology, 1986, University of Idaho
M.S. Resource Management, 1984, University of Idaho
B.A. Geology, 1980, California State University, Chico
15 years experience

Eric R. Mintz, Environmental Specialist: Document Coordinator; EIS/EIR preparation, Noise, Land Use, Socioeconomics, Utilities and Public Services
B.S. Water Resources, 1986, State University of New York at Oneonta
9 years experience

Dr. Terry Thomas, Principal: Deputy Document Coordinator; EIS/EIR preparation, Biological Resources
D.Env. Environmental Science and Engineering, 1982, University of California, Los Angeles
M.S. Plant Sciences, 1976, University of California, Riverside
B.S. Biology, 1974, University of California, Los Angeles
20 years experience

John Heggeness, R.G, R.E.G., Geologist: Geologic and Mineral Resources, Hydrologic Resources
M.S. Geology, 1981, University of Nevada, Reno
B.S. Geology, 1976, Utah State University
15 years experience

Daniel Davis, R.G., Geochemist: Geologic and Mineral Resources, Hydrologic Resources
M.S. Geochemistry, 1989, State University of New York at Stony Brook
B.S. Geosciences, 1985, University of Arizona
8 years experience

Kent Samuelson, Geologist: Geologic and Mineral Resources~~;~~, Soils
B.A. Geology, 1978, University at Boulder, Colorado
15 years experience

Peter Kraatz, Senior Engineer: Alternatives
B.S. Geology, 1984, University of California at Los Angeles
M.S. Geological Engineering, 1989, University of Nevada at Reno
12 years experience

Joseph M. DeStefano II, Environmental Specialist: Air Resources~~;~~
B.A. Political Science (Public Administration), 1992, Loyola Marymount University, Los Angeles
3 years experience

Teressa C. Casaceli, Associate Senior Environmental Specialist: Alternatives
B.A. Geology, 1980, Hartwick College, Oneonta, New York
11 years experience

Janet Tentler, Environmental Specialist: Document Production, Graphics
B.A. Environmental Studies, 1986, University at Hayward, California
8 years experience

The Applicant and its consultants provided technical reports for, or input into, the preparation of this EIS/EIR. These reports or this input was independently reviewed by the BLM-ECRA and ICPBD for accuracy and completeness.

Chemgold, Inc.

Steve Baumann, General Manager: EIS/EIR preparation coordination
C. Kevin McArthur, (former) Vice President and General Manager: EIS/EIR preparation coordination
Dan Purvance, Geologist: environmental studies coordination, hydrology, geology, and CADD support
Ron Wyrick, Metallurgist: project design
Dale Louks, Project Engineer: project design

Ted Rado, Consulting Wildlife Biologist

Biological Assessment, 1996
Biological Survey Report, May 1995

Ted Rado, Wildlife Biologist: tortoise surveys, general wildlife and plant inventory, deer sign survey, reptiles and amphibians, small mammal livetrapping, report preparation
Peter Woodman, Biological Consultant: tortoise surveys, general wildlife and plant inventory, plant surveys, bird surveys
Karen Jones, Wildlife Biologist: tortoise surveys, general wildlife and plant inventory, plant surveys, bird surveys
Ken Sweat, Field Biologist: tortoise surveys

ASM Affiliates, Inc.

Cultural Resources Inventory of Indian Pass: An Inventory and Evaluation for the Imperial Mine Project, Imperial County, California, July 1996
A Supplemental Cultural Resources Inventory and Evaluation of the Power Supply Route for the Imperial Project, Imperial County, California, September 1996.

Jerry Schaefer, Ph.D., SOPA, Archaeologist: principal investigator, document preparation

Bamberg Associates

Soil Resource Evaluation for Imperial Project, August 1995
Vegetation Baseline Survey, Imperial Project, Imperial County, California, August 1995

Samuel A. Bamberg, Ph.D., Principal Investigator
Ingrid E. Hanne

Paul R. Krausman

Desert Deer and the Chemgold Imperial Project, October 27, 1995

Paul R. Krausman, Ph.D., Professor and Research Scientist, Wildlife Ecology

Brown-Berry Biological Consulting

An Assessment of the Imperial Project Area With Respect To Bat Habitat and Occurrences, September 28, 1995

Patricia E. Brown, Ph.D., Wildlife Biologist: principal investigator

WESTEC, Inc.

WESTEC, Inc., 1994: Preliminary Hydrologic Analyses for the Imperial Mine Project, October, 1994.
WESTEC, Inc., 1995: Geotechnical Final Design Report for the Imperial Heap Leach Facilities, Imperial Gold Project (Draft), August 1995.
WESTEC, Inc., 1996: Baseline Report for the Imperial Project, February, 1996.

9. REFERENCES

Andrew, N., 1995: California Department of Fish and Game, Personal Communication, November 13, 1995.

Arizona Department of Commerce, 1994: Profile: Yuma County, Arizona, June 1994.

Arizona Public Service Company, Economic Development Department, and Azstats, 1994: Arizona Statistical Review, Edition 46.

ASM Affiliates, Inc, 1996a: Cultural Resources Inventory of Indian Pass: An Inventory and Evaluation for the Imperial Mine Project, Imperial County, California, July 1996.

ASM Affiliates, Inc, 1996b: A Supplemental Cultural Resources Inventory and Evaluation of the Power Supply Route for the Imperial Project, Imperial County, California, September 1996.

Bamberg, S.A., and I.E. Hanne, 1995a: Soil Resource Evaluation for Imperial Project. Report to Chemgold, Inc., Imperial Project, Bamberg Associates, August 1995.

Bamberg, S.A., and I.E. Hanne, 1995b: Vegetation Baseline Survey - Imperial Project, Imperial County, California. Report to Chemgold, Inc., Imperial Project, Bamberg Associates, August 1995.

Bedlinger, M.S., W.H. Langer, and W.R. Moyle. 1983. Maps Showing Ground-Water Units and Withdrawal, Basin and Range Province, Southern California. To Accompany Water Resource Investigation Report 83-4116-A. Department of the Interior, United States Geological Survey

Berry, K.H. 1972. Report on Tortoise Relocation Project, July 1971 to November 1971. Division of Highways, State of California, in Partial Fulfillment of Contract F-9353.

Berry, K.H. 1974. The Ecology and Social Behavior of the Chuckwalla, Sauromalus obesus obesus Baird. University of California Press, Berkeley. 60 pp.

Berry, K.H. 1975. Desert tortoise relocation project: status report for 1973. Department of Transportation, State of California. Contract F-9353. 37 pp.

Berry, K.H. and L.L. Nicholson. 1984. A summary of human activities and their impacts on desert tortoise populations and habitat in California. In: K.H. Berry (ed.): The status of the desert tortoise (*Gopherus agassizii*) in the United States. Rept. to the

U.S. Fish and Wildlife Service from the Desert Tortoise Council on Order No. 11310-0083-81. Pp. 61-117.

Berry, K.H. (ed.) 1984. The Status of the Desert Tortoise (Gopherus agassizii) in the United States. Rept. to the U.S. Fish and Wildlife Service from the Desert Tortoise Council on Order No. 11310-0083-81. 838 pp.

BioSystem Analysis. 1989. Endangered Species Alert Program Manual-Species Accounts and Procedures. Developed for the Southern California Edison Company Environmental Affairs Division, Rosemead, California.

Blong, B., 1993: Use of Habitat by Colorado Desert Deer; California Department of Fish and Game, 1993.

Bolster, B., 1989: The status of the flat-tailed horned lizard (*Phrynosoma mcalli*) in California. California Department of Fish and Game Report. 52 pp.

Brown, P.E., 1995: Possible Bat Occurrences on the Chemgold Imperial Project Site, September 28, 1995.

Brown, P.E. 1994: The California Leaf-Nosed Bat (Microtus californicus) and American Girl Mining Joint Venture-Impacts and Solutions. In: Proceedings VI: Issues and Technology in the Management of Impacted Wildlife. Pp. 54-56.

Brown, P.E. 1993: The California Leaf-Nosed Bat (Macrotus californicus) at the American Girl Mine. Abstract of Paper Presented March 10, 1993, at the California Mining Association Meeting in Monterey, California. Copy on File with American Girl Mining Joint Venture, Winterhaven, California. 2 pp.

Brown, P.E., 1992a: A Spring Survey of the American Girl Canyon Project and the Oro Cruz Project - Cargo Muchacho Mountains, Imperial County, California; American Girl Mining Joint Venture, Inc., June 5, 1992.

Brown, P.E. 1992b: A summer survey for the California leaf-nosed bat in the Cargo Muchacho Mountains. Prepared for the American Girl Mining Joint Venture, Winterhaven, California. 4 pp.

Brown, P.E. 1989: Bat inventory of the Oro Cruz Project, Cargo Muchacho Mountains, Imperial County, California. Copy on file with the American Girl Mining Joint Venture, Winterhaven, California. 8 pp.

Brown, P.E., R.D. Berry, and C. Brown. No date. Bats and Mines: Finding Solutions. Copy on file with American Girl Mining Joint Venture, Winterhaven, California. 3 pp.

Brown-Berry Biological Consulting, 1992: A Summer Survey for the California Leaf-Nosed Bat in the Cargo Muchacho Mountains; American Girl Mining Joint Venture, Inc., October 2, 1992.

Brown, P.E., Berry, R.D., Brown, C., 1994: The California Leaf-Nosed Bat (Macrotus Californicus) and American Girl Mining Joint Venture - Impacts and Solutions, 1994.

Burge, B.L. and W.G. Bradley. 1976: Population Density, Structure, and Feeding Habits of the Desert Tortoise (*Gopherus agassizii*) on a Low Desert Study Area in Southern Nevada. In: N.J. Engberg, S. Allan, and R.L. Young (eds.). Desert Tortoise Council Proceedings of the 1976 Symposium. Pp. 51-74.

Burge, B.L. and W.G. Bradley. 1976: Population Density, Structure, and Feeding Habits of the Desert Tortoise (Gopherus agassizii) on a Low Desert Study Area in Southern Nevada. In: N.J. Engberg, S. Allan, and R.L. Young (eds.). Desert Tortoise Council Proceedings of the 1976 Symposium. Pp. 51-74.

Burt, W.H. and R.P. Grossenheider. 1964: A Field Guide to the Mammals. Houghton-Mifflin Company, Boston. 284 pp.

California Air Pollution Control Officers Association (CAPCOA), 1993: CAPCOA Air Toxics "Hot Spots" Program Revised 1992 Risk Assessment Guidelines, Santa Barbara, California.

California Air Resource Board (CARB), 1994: California Air Quality Data, Summary of 1993 Air Quality Data; California Air Resource Board, Sacramento, California.

California Department of Finance, 1994: California Statistical Abstract, 1994.

California Department of Fish and Game, 1996a: Final Environmental Document Regarding Deer Hunting. (Table 5-14b. Zone D-12 expected buck ratio, population size, hunter kill and harvest buffer for alternatives)(April 10, 1996).

California Department of Fish and Game, 1996b: Memorandum - 1995 Final Deer Take Report.

California Department of Fish and Game 1995: Listed Species in Imperial County. (Revised 12/26/95).

California Department of Fish and Game. 1991. Annual Report on the Status of California State Listed Threatened and Endangered Animals and Plants. State of California publication, Sacramento. 192 pp.

California Department of Health Services, 1990: California Statewide Radon Survey Screening Results; California Department of Health Services, Sacramento, California.

California Department of Water Resources, 1965: Hydrologic Data: 1963, Bulletin No. 130-63, Volume V: Southern California, November 1965.

California Environmental Protection Agency, Air Resources Board, 1994: California Air Quality Data, Summary of 1993 Air Quality Data - Gaseous and Particulate Pollutants; California Environmental Protection Agency, Air Resource Board, Sacramento, California.

California Environmental Protection Agency, Air Resources Board, —1989, 1990, 1991, 1992, 1993, 1994.: California Air Quality Data, Summaries for 1988, 1989, 1990, 1991, 1992, and 1993 Air Quality Data - Gaseous and Particulate Pollutants; California Environmental Protection Agency, Air Resources Board, Sacramento, California.

California Native Plant Society. 1994: California Native Plant Society's Inventory of Rare and Endangered Vascular Plants in California. Special Publ. No. 1, Fifth Edition,Sacramento, California. 338 pp.

California Native Plant Society. 1988: California Native Plant Society's Inventory of Rare and Endangered Vascular Plants in California. Special Publ. No. 5, Sacramento, California. 168 pp.

Celentano, R.R., and J.R. Garcia, 1984: The Burro Deer Herd Management Plan; California Department of Fish and Game, March 1984.

Chemgold Inc., 1994a: Plan of Operations, Chemgold Inc. Imperial Project.

Chemgold Inc., 1994b: Reclamation Plan, Chemgold Inc. Imperial Project.

Clark, W.B., 1970: Gold Districts of California; California Division of Mines and Geology, Bulletin 193, 186 p.

Condor Minerals Management, Inc. 1991a. First Supplemental Environmental Impact Report for the Proposed Chemgold, Inc. Picacho Mine Dulcina Pit Phase 2, Imperial County, California. Prepared for Chemgold, Inc., Yuma, CA.

Condor Minerals Management, Incorporated. 1991b. Final Supplemental Environmental Impact Report for the Proposed Chemgold Inc. Picacho Mine Dulcina Pit Phase 2, Imperial County, California. Prepared for Chemgold, Incorporated, Yuma, Arizona.

County of Imperial, 1993a: Volume III- Final Environmental Impact Report for the County of Imperial, General Plan, Comments and Responses, Brian F. Mooney Associates, October 1993.

County of Imperial, 1993b: Volume II - Final Environmental Impact Report for the County of Imperial General Plan, Brian F. Mooney Associates, May 1993.

County of Imperial, 1993c: Volume 1- Final Program Environmental Impact Report for the County of Imperial General Plan, Brian F. Mooney Associates.

County of Imperial, 1993d: Draft Imperial County General Plan Update, Brian F. Mooney Associates.

County of Imperial, 1993e: Imperial County General Plan, Imperial County, California, Brian F. Mooney Associates.

County of Imperial, 1992: Imperial County, California, Facts and Figures for 1992.

Davis, J., and B. Schaefer, 1995: Burro Deer Herd D-12 Action Plan; California Department of Fish and Game - Region 5, 1995.

DeDyker and Associates. 1994. Draft Environmental Impact Statement, Oro Cruz Operator of the American Girl Mining Project. Prepared for the U.S. Bureau of Land Management, El Centro Resource Area Office, California.

Desert Tortoise Recovery Team. 1993a. Desert Recovery Plan for the Desert Tortoise (Mojave Population). Prepared for the U.S. Fish and Wildlife Service, Portland, Oregon. 173 pp. + append.

Desert Tortoise Recovery Team. 1993b. Proposed Desert Wildlife Management Areas for recovery of the Mojave population of the desert tortoise. Prepared for the U.S. Fish and Wildlife Service, Portland, Oregon. 139 pp.

Dutcher, L.C., W.F. Hardt, and W.R. Moyle, 1972: Preliminary Appraisal of Ground Water Storage with Reference to Geothermal Resources in the Imperial Valley Area, California, United States Geological Survey Circular 649.

Environmental Management Associates, 1995: Waste Characterization Study, prepared for Chemgold, Inc., Imperial Project, Imperial County, California, December 1995.

Environmental Management Associates, 1996a: Waters Study, prepared for Chemgold, Inc., Imperial Project, Imperial County, California, February 1996.

Environmental Management Associates, 1996b: Supplemental Waste Characterization Study, Imperial Project, Imperial County, California, September 1996.

Environmental Management Associates, 1996c: Supplemental Hydrology Study, Imperial Project, Imperial County, California, September 1996.

Environmental Solutions, Inc., 1994: Air Quality Analysis for the Mesquite Regional Landfill, March 1994.

Environmental Solutions, Inc., 1993a: Hydrogeology Technical Report for the Mesquite Regional Landfill, December 1993.

Environmental Solutions, Inc., 1993b: Faulting and Seismicity Report for the Mesquite Regional Landfill, December 1993.

Environmental Solutions~~.~~, Inc., 1987: Final Environmental Impact Report/Environmental Assessment for the Proposed VCR Mining Project, Imperial County, California. Prepared for the U.S. Department of Interior, Bureau of Land Management El Centro Resource Area Office. 184 pp. + append.

~~EPA, 1985: AP 42; Compilation of Air Pollutant Emission Factors; Environmental Protection Agency, Washington, D.C.~~

Faulkner, D.K. 1990: Current Knowledge on the Biology of the Moth Lacewing Oliarces clara Banks (Insecta: Neuroptera: Ithonidae). In: (M.W. Mansell and H. Aspock eds.): Proceedings of the Third International Symposium on Neuroptology. Paper presented in Pretoria, South Africa. Pp. 197-203.

Finger, T., 1995: Bureau of Land Management, El Centro Resource Area, Personal Communication.

Garrett, K. and J. Dunn. 1981: Birds of Southern California, status and Distribution. The Artisan Press, Los Angeles, California. 408 pp.

Grinnell, H.W. Review of the recent mammal fauna of California. Univ. Calif. Publ. Zool. 40:71-284.

o

GSi/Water, 1995: Preliminary Assessment of Aquifer Potential- Imperial County, California, January 24, 1995.

GSi/Water, 1993: Preliminary Assessment of Available Groundwater, Indian Rose Project, Imperial County, California, July 1, 1993.

Hall, E.R. 1981. Mammals of North America. 2nd Ed. John Wiley and Sons, New York.

Haywood, R.J., B.W. Anderson, and R.D. Ohmart, 1984: Habitat Use by Four Radio-Collared Mule Deer Along the Lower Colorado River; Center for Environmental Studies, Arizona State University, March 1984.

Heath, E.G., 1992: Faulting and Seismicity in the Vicinity of the Mesquite Regional Landfill. Letter report to Environmental Solutions, Inc. in Appendix D of the Final Environmental Impact Statement and Environmental Impact Report for the proposed Mesquite Regional Landfill, 1994.

Hickman, J.C. (ed.), 1993: The Jepson Manual, Higher Plants of California. University of California Press, Berkeley. 1,400 pp.

Hoffman, J.D., G.B. Gunnells, and J.M. NcNeal, 1991: National Geochemical Data Base: National Uranium Resource Evaluation Data for the Conterminous Western United States, U.S. Geological Survey, Washington D.C., DDS-1, 1991.

Ingles, L.G. 1964: Mammals of the Pacific States. Stanford University Press, California. 506 pp.

Imperial County Planning Commission, 1995: Notice of Declaration, April 26, 1995.

Imperial County Planning Department, 1978: Final Environmental Impact Report, Heber Geothermal Demonstration Project, Imperial County, California, March 1978.

Imperial Irrigation District and The Metropolitan Water District of Southern California, Agreement Relating to the Construction of a Concrete Lined Canal Parallel to the Existing All-American Canal, February 3, 1995.

Jaeger, E.C. 1941: Desert Wild Flowers. Stanford University Press, California. 322 pp.

Jennings, M.R. and M.P. Hayes. 1994: Amphibian and Reptile Species of Special Concern in California. Prepared for the California Department of Fish and Game, Inland Fisheries Branch, Rancho Cordova, California. 255 pp.

Jorgensen, N., 1995: Imperial County Department of Public Works, Personal Communication, November 21, 1995.

Joyner, W.B., and T.E. Fumal, 1986, Predictive Mapping of Earthquake Ground Motion. U.S. Geological Survey Professional Paper 1360, pp. 203-220, 1986.

Karl, A.E. 1994: Biological inventory for Mesquite Regional Landfill, Desert Tortoise Surveys. Prepared for Environmental Solutions, Irvine, California. 32 pp. + append.

Karl, A.E. 1992: Gosser Exchange properties, desert tortoise inventory. Prepared for Environmental Solutions, Irvine, California. 12 pp. + append.

Kiva Biological Consulting: 1991: Assessment of biological resources on a portions of Sections 10,11, 14 and 15 of T.14S.,R.22E., Picacho Mine, Imperial County, California. Prepared for Chemgold, Incorporated. 22 pp.

Klauber, L.M. 1939: Studies of reptile life in the arid southwest. Bull. Zool. Soc. San Diego 14:1-100.

Krausman, Paul, 1995: Desert Deer and the Chemgold Imperial Project, October 27, 1995.

Loeltz, O.J., B. Irelan, J.H. Robison, and F.H. Olmsted, 1975: Geohydrologic Reconnaissance of the Imperial Valley, California, United States Geological Survey Professional Paper 486-k.

Luckenbach, R.A. and R.B. Bury, 1983: Effects of off-road vehicles on the biota of the Algodones Dunes, Imperial County, California. J. Applied Ecology 20: 265-286.

Lyons, T., 1995: Imperial Irrigation District, Personal Communication.

Manfredi, T., 1995: U.S.M.C. - Yuma Air Station, Personal Communication.

Mayhew, W.W. 1965: Hibernation in the horned lizard Phrynosoma mcallii. Comp. Biochem. Physiol. 16:103-119.

Mayhew, W.W. and B.A. Carlson: 1986. Status of the flat-tailed horned lizard (Phrynosoma mcallii) in California. Final report prepared for the California Department of Fish and Game under Contract no. 85/86 C-1355. 34 pp.

McArthur, C.K., 1995: Chemgold, Inc., Personal Communication.

McArthur, C.K., 1995: Chemgold, Inc., Letter to Eric Mintz of EMA re: Socio-economic data for Imperial Project, July 27, 1995.

McCalvin, C. 1993: Surveys for seven rare plant species, the flat-tailed horned lizard, and the Colorado desert fringe-toed lizard. Report to Bureau of Reclamation. Boulder City, Nevada.

McIvor, D.E., J.A. Bissonette, and G.S. Drew, 1994. A Critical Review of the Status of the Yuma Mountain Lion, *Felis concolor browni*. Utah Coop. Fish and Wildlife Resource Unit (U.S. National Biological Survey) Report 94-1. 155 pages.

Medica, P.A., C.L. Lyons, and F.B. Turner. 1982: A comparison of 1981 populations of desert tortoises (*Gopherus agassizii*) in grazed and ungrazed areas in Ivanpah Valley, California. In: K. Hashagan (ed.): Desert Tortoise Council Proceedings of the 1982 Symposium. Pp. 99-124.

Messick, J.P. 1987: North American Badger. In: Wild Furbearer Management and Conservation in North America. Published by the Ministry of Natural Resources, Ontario, Canada. Pp. 586-597.

Miller, A.H. 1931: Systematic revision and natural history of North American shrikes (Lanius). Univ. Cal. Publ. Zool. 38:11-242.

Miller, A.H. and R.C. Stebbins. 1964: The Lives of Desert animals in Joshua Tree National Monument. University of California Press, Berkeley. 452 pp.

Brian F. Mooney and Associates, 1991: Cultural Resource Survey and Assessment of the Bema-Indian Rose Project Area, June 1991.

Morton, P.K., 1977, Geology and Mineral Resources of Imperial County, California: California Division of Mines and Geology, County Report No. 7, 104 p.

Munz, P.A. 1974: A Flora of Southern California. University of California Press. 1086 pp.

National Geographic Society. 1987: Field Guide to the Birds of North America. Second Edition. The National Geographic Society, Washington, D.C. 464 pp.

National Research Council (NRC), 1979: Surface Mining of Non-Coal Minerals, Prepared by the Committee on Surface Mining and Reclamation, Report No. ISBN-0-309-02942-2 (November).

Nevada Department of Wildlife (NDOW), 1992: Mining and Wildlife, Volume 1, Issue 2, Carson City, Nevada.

Norris, R.M., and R.W. Webb, 1976: Geology of California; John Wiley & Sons, Inc., New York.

Norris, K.S. 1949: Observations on the Habits of the Horned Lizard, Phrynosoma mcallii. Copeia 1949:176-180.

NRC, 1979: National Research Council, Surface Mining of Non-Coal Minerals. Prepared by the Committee on Surface Mining and Reclamation, Report No. ISBN-0-309-02942-Z.

Office of Arid Lands Studies. 1992: Botanical and Wildlife Analysis of the Proposed Mesquite Regional Landfill Study Area. Prepared for Environmental Solutions, Inc., Irvine, California. 74 pp. + append.

Olech, L.A. No date: Status of the Flat-Tailed Horned Lizard (Phrynosoma mcallii) on Bureau of Land Management Administered Land in California. U.S. Dept. of Interior, Bureau of Land Management, El Centro, California. 12 pp. + append.

Pechan, E.H. & Associates, Inc., 1993: State Implementation Plan for PM-10 in the Imperial Valley. Prepared for the Imperial County Air Pollution Control District, September, 1993.

Pritchett, L. 1984: Botanical Survey of the Gold Fields Mining Corporation Claims on Quartz Peak and Ogilby Quadrangles. Prepared for St. Clair Research Systems, Imperial College, El Centro, California. 35 pp.

Purvance, D., 1995: Chemgold, Inc., Letter to Peter Kraatz of EMA re: Imperial Project water analysis summary for water samples taken from drill holes within the mine and process area, October 3, 1995.

Rado, T., 1996: Biological Assessment, Chemgold Imperial Project, Imperial County, California, Prepared on behalf of the Bureau of Land Management, El Centro Resource Area.

Rado, T., 1996: Personal Communication, Feb. 9, 1996.

Rado, T., 1995: Biological Survey Report, Chemgold Imperial Project, California, May 1995.

Rado, T. No Date. Analysis of Actual and Potential Loss of Flat-Tailed Horned Lizard (Phrynosoma mcallii) Habitat. Draft. U.S. Dept. of Interior, Bureau of Land Management, Sacramento, California. 30 pp.

Rorabaugh, J.C., C.L. Palermo, and S.C. Dunn, 1987: Distribution and relative abundance of the flat-tailed horned lizard (*Phrynosoma mcalli*) in Arizona. Southwest. Natural 32(1): 103-109.

Rose, A.W., H.E. Hawkes, and J.S. Webb, 1979: Geochemistry in Mineral Exploration, Second Edition; Academic Press, New York, 657 p.

Schoeck, A., 1995: -Bureau of Land Management, El Centro Resource Area, Personal Communication.

Schwartzmann, J.L., and R.D. Ohmart. 1977: Quantitative vegetational data of desert tortoise habitat (Gopherus agassizii) habitat in the lower Sonoran Desert. In: M. Trotter and C.G. Jackson, Jr. (eds.): Desert Tortoise Council Proceedings of the 1977 Symposium. Pp. 112-115.

Skinner, M.W. and B.M. Pavlik. 1994: Inventory of Rare and Endangered Vascular Plants of California. Fifth edition. Published by the California Native Plant Society, Sacramento, California. 338 pp.

Smith, H.M. 1965. Handbook of Lizards: Cornell University Press, Ithaca, New York. 557 pp.

South Coast Air Quality Management District (SCAQMD) - Stationary Source Division, 1994: Permit Application Training Program Manual; South Coast Air Quality Management District, Diamond Bar, California.

SRK, 1989: Draft Acid Rock Drainage Technical Guide, Volume I.

State of California Economic Development Department, 1992a: Economic Development Department Annual Planning Information, Imperial County.

State of California Economic Development Department, 1992b: 1991 Statistical Abstract.

State of California Economic Development Department, 1993: Population Projections By Race/Ethnicity For California and its Counties 1990-2040, Report 93 P-1.

State of California Economic Development Department, Economic Development Department, 1991: Annual Planning Information, Imperial County.

Stebbins, R.C., 1985: A Field Guide to Western Reptiles and Amphibians. Houghton Mifflin Co., Boston, Mass.

Tierra Madre Consultants. 1987: Gold Fields Operating Company, VCR Mining Project, Desert Tortoise Report. Copy on File with the Bureau of Land Management El Centro Resource Area Office, California. 11 pp.

Thompson, J.R. and V.C. Bleich, 1993, A comparison of mule deer survey techniques in the Sonoran Desert of California. California Fish and Game 79(2): 70-75.

Tosdal, R.M., G.F . Willis, S.L. Manske, D. Lang, and M. Lusk, 1991: Mesquite Mining District, Southeastern California. Society of Economic Geology Field Trip. San Diego, California, October, 1991.

Turner, F.B., P.A. Medica, and H.O. Hill. 1980a: The status of the flat-tailed horned lizard (Phrynosoma mcallii) at nine sites in Imperial and Riverside Counties, California. Prepared for the U.S. Dept. of Interior, Bureau of Land Management, Riverside, California. Contract No. YA-512-CT8-58.

Turner, F.B., J.C. Rorabaugh, E.C. Nelson and M.C. Jorgensen. 1980b: A Survey of the Occurrence of the Flat-Tailed Horned Lizard (Phrynosoma mcallii) in California. Prepared for the U.S. Dept. of Interior, Bureau of Land Management, Riverside, California. Contract No. YA-512-CT8-58.

Turner, F.B. and P.A. Medica. 1982: The Distribution and Abundance of the Flat-Tailed Horned Lizard, Phrynosoma mcallii. Copeia 1982:815-823.

Turner, F.B., K.H. Berry, D.C. Randall and G.C. White. 1987: Population Ecology of the Desert Tortoise at Goffs, California, 1983-1986. Prepared Under Contract Between the Southern California Edison Company and the University of California, by a Memorandum of Understanding and Purchase Order (C1363901) between the Southern California Edison Company and the Bureau of Land Management, and by Contract DE-AC03-76-SF00012 between the U.S. Department of Energy and the University of California. 101 pp.

Turner, R.M. and D.E. Brown, 1982: Sonoran desert scrub. In Biotic Communities of the American Southwest-Unites States and Mexico. Desert Plants (4(1-4): 181-221.

U.S. Bureau of the Census, 1992: 1990 Census of Population and Housing, Public Law (P.L.) 94-171 Data (California).

U.S. Bureau of Economic Analysis, 1993: Region Economic Information System.

U.S. Bureau of Reclamation. 1996: Description and Assessment of Operations, Maintenance and Sensitive Species of the Lower Colorado River. Draft Biological Assessment Prepared for the U.S. fish and Wildlife Service and the Lower Colorado River Multi-Species Conservation Program. 226 pp.

U.S. Bureau of Land Management, California Desert District, and the Imperial County Planning and Building Department, 1995a: Final Environmental Impact Statement and Environmental Impact Report for the Proposed Mesquite Regional Landfill, Imperial County, California (CA-060-02-5440-10-B026).

U.S. Bureau of Land Management, 1995b: Record of Decision for the Oro Cruz Operation of the American Girl Mining Project, Imperial County, California, California Desert District, El Centro Resource Area, January 30, 1995.

U.S. Bureau of Land Management and the Imperial County Planning and Building Department, 1994a: Air Quality Assessment Report, Mesquite Regional Landfill (Appendix F), October 1994.

U.S. Bureau of Land Management, 1994b: Draft Environmental Impact Statement, Oro Cruz Operation of the American Girl Mining Project, April 1994.

U.S. Bureau of Land Management. 1994c: BLM Wilderness Areas, National Parks and Preserve Maps and Information. Copy on File with the Bureau of Land Management, California Desert District Office, Riverside, California.

U.S. Bureau of Land Management. 1992a: Solid Minerals Reclamation Handbook (BLM Manual Handbook H-3042-1.

U.S. Bureau of Land Management. 1992b: California Cyanide Management Plan. Prepared by the U.S. Department of Interior, Bureau of Land Management, Division of Mineral Resources, California State Office. 33 pp.

U.S. Bureau of Land Management and the Imperial County Planning and Building Department, 1993a: Hydrogeologic Assessment Report, Mesquite Regional Landfill (Appendix B), December 1993.

U.S. Bureau of Land Management and the Imperial County Planning and Building Department, 1993b: Faulting and Seismicity Report in the Vicinity of the Mesquite Regional Landfill (Appendix C), December 1993.

U.S. Bureau of Land Management and California Department of Fish and Game. 1992: California Statewide Desert Tortoise Management Policy. Prepared by the Bureau of

Land Management, California Desert District, Riverside, California, and the California Department of Fish and Game. 57 pp.

U.S. Bureau of Land Management. 1989: Environmental Assessment for Selected Control of the Common Raven to Reduce Desert Tortoise Predation in the Mojave Desert, California. Jointly Prepared by the U.S. Bureau of Land Management, U.S. Fish and Wildlife Service, and California Department of Fish and Game. 33 pp.

U.S. Bureau of Land Management, 1988: National Environmental Policy Act Handbook, BLM Handbook H-1790-1, 1-1547, October 15, 1988.

U.S. Bureau of Land Management, 1987 Amended California Desert Conservation Area Plan, 1987.

U.S. Bureau of Land Management, 1986a: Visual Resource Contrast Rating, Manual Section 8431-1.

U.S. Bureau of Land Management, 1986b: Visual Resource Inventory, Manual Section H-8410-1.

U.S. Bureau of Land Management, 1985: Visual Contrast Rating Worksheet, Manual Section 8400-4.

U.S. Bureau of Land Management and the Imperial County Planning and Building Department, 1984a: Final Environmental Impact Report/ Environmental Impact Assessment (EIR/EA) for the Proposed Mesquite Project, Imperial County, California, 1984.

U.S. Bureau of Land Management, 1984b: Visual Resource Management, Manual Section 8400.

U.S. Bureau of Land Management. 1980: The California Desert Conservation Plan, 1980. Prepared by the U.S. Dept. of Interior, Bureau of Land Management, California Desert Plan Program, Riverside, California. 173 pp.

U.S. Bureau of Land Management, 1978a: Environmental Assessment, Manual Section 8440, 1978.

U.S. Bureau of Land Management, 1978b: Application of Visual Resource Management Principles to Project Planning and Design, Manual Section 8430, 1978.

U.S. Bureau of Land Management. No Date: Management Strategy for the Flat-Tailed Horned Lizard (Phrynosoma mcallii) on Bureau of Land Management Administered Lands Within the California Desert Conservation Area. Copy on File with the Bureau of Land Management El Centro Resource Area Office, California. 36 pp. + append.

U.S. Bureau of Reclamation, 1994: Final Environmental Impact Statement/Final Environmental Report, All American Canal Lining Project, Imperial County, California, Lower Colorado Region, California Desert District, El Centro Resource Area, March 1994.

U.S. Department of Interior, 1995a: Overview and Status of the Northern and Eastern Colorado Desert Coordinated Management Plan, July 1995.

U.S. Department of Interior, 1995b: State of California Wilderness Status Map; U.S. Department of Interior/Bureau of Land Management, January 1995.

U.S. Department of Interior, 1994: BLM Wilderness Areas, National Parks and Preserve, Maps and Information, California; U.S. Department of Interior/Bureau of Land Management, October 1994.

U.S. Department of Interior, 1991: The California Desert, Why Mining Is Important, Division of Mineral Resources; Bureau of Land Management, April 1991.

U.S. Department of Interior, 1988: National Environmental Policy Act Handbook, BLM Handbook H-1790-1, 1-1547, October 15, 1988; Bureau of Land Management.

U.S. Department of Interior, 1980: The California Desert Conservation Area Plan Alternatives and Environmental Impact Statement, Bureau of Land Management, February 1980.

U.S. Department of Interior, Midway Well, Desert Access Guide #21, Bureau of Land Management, California Desert District.

U.S. Department of Interior, Pamphlet: Energy and Mineral Resources on the Public Lands, Bureau of Land Management.

U.S. Department of Interior, Pamphlet: California Imperial Sand Dunes Recreation Area, Bureau of Land Management, California Desert District.

U.S. Department of Interior, Pamphlet: National Back Country Byway Program, Bureau of Land Management.

U.S. Department of Interior, Bureau of Land Management - National Recreation Guide, Bureau of Land Management.

U.S. Department of Interior, Bureau of Land Management - Imperial Sand Dunes Recreation Area, Bureau of Land Management.

U.S. Environmental Protection Agency, 1985: Compilation of Air Pollutant Emission Factors (AP-42); Environmental Protection Agency, Washington, D.C.

U.S. Environmental Protection Agency, 1986: Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846); Environmental Protection Agency, Washington, D.C.

U.S. Fish and Wildlife Service (USFWS), 1990: Interim Techniques Handbook for Collecting and Analyzing Data on Desert Tortoise Populations and Habitats. Chapter III, *Protocols for Handling Live Tortoises*.

Virginia, R.A. and D.A. Bainbridge, 1987: Revegetation in the Colorado Desert: Lessons from the Study of Natural Systems. In Proceedings of the Second Native Plant Revegetation Symposium. April 15-18, 1987. San Diego, CA. University of Wisconsin Arboretum, Madison, Wisconsin: Society for Ecological Restoration and Management; 232 pp.

Weathers, W.W. 1983: Birds of Southern California's Deep Canyon. University of California Press, Berkeley. 266 pp.

Weaver, R.A. and J.L. Mensch, 1969: A Report on the Desert Bighorn Sheep in Eastern Imperial County, November 1968-January 1969, The Resources Agency, California Department of Fish and Game.

WESTEC, Inc., 1996: Baseline Report for the Imperial Project, February, 1996.

WESTEC, Inc., 1994: Preliminary Hydrologic Analyses for the Imperial Mine Project, October, 1994.

WESTEC, Inc., 1995: Geotechnical Final Design Report for the Imperial Heap Leach Facilities, Imperial Gold Project (Draft), August 1995.

WESTEC Services, 1988: Cultural Resource Inventory, Number 2, for 27 Drill Sites Within the Amir-Indian Rose Area Lease, March 1988.

WESTEC Services, 1987: Cultural Resource Inventory and Avoidance Program for 15 Drill Sites Within the Amir-Indian Rose Area Lease, July 1987.

Weaver, R.A. and J.L. Mensch. 1969: A Report on Desert Bighorn Sheep in Eastern Imperial County. The Resources Agency, Department of Fish and Game. Report W-51-R-14. 17 pp.

Western Ecological Services Company (WESCO). 1992: Biological Inventory of the Gosser Properties Mesquite Regional Landfill Project. Prepared for Environmental Solutions, Inc., Irvine, California. 31 pp. + append.

Western Resource Development. 1993: Biological Assessment, Oro Cruz Mining Operation for the Expansion of the American Girl Project, Imperial County, California. Prepared for the U.S. Bureau of Land Management, El Centro Resource Area Office, California. 76 pp.

Williams, D.F. 1986: Mammalian Species of Concern in California. California Dept. of Fish and Game, Wildl. Admin. Rept. 86-1. 112 pp.

Wilson, R.P., and S.J. Owen-Joyce~~ S.J.~~, 1994: Method to Identify Wells That Yield Water that will be Replaced by Colorado River Water in Arizona, California, Nevada, and Utah, ~~Wilson, R.P., Owen-Joyce S.J.,~~ United States Geological Survey Water Resources Investigations Report 94-4005, 1994.

Woodbury, A.M. and R. Hardy. 1948. Studies of the Desert Tortoise, Gopherus agassizii. Ecol. Mono. 18:145-200.

Yuma Economic Development Corporation, 1994: Yuma County, Arizona - A World of Opportunity for your Business, 1994/1995.

10. GLOSSARY AND LIST OF ACRONYMS

ACEC	Area of Critical Environmental Concern
ACHP	Advisory Council on Historic Preservation
ACOE	Army Corps of Engineers
afy	Acre-feet-per year
AIRFA	American Indian Religious Freedom Act
Amos-Ogilby-East Mesa Basin	A ground water basin of approximately 860 square miles located within the southeastern portion of Imperial County, California
AMSL	Above Mean Sea Level
ancillary area	Project ancillary area
ANFO	A mixture of ammonium nitrate and fuel oil, used as an explosive for blasting purposes
ANP	Acid Neutralization Potential
AP	Acid Potential
APE	area of potential effect
aquifer	Permeable strata of gravel or sand that serve as conduits for ground water flow
ATF	United States Bureau of Alcohol, Tobacco and Firearms
AWVTE	Average weekday vehicle trip ends
backfill	The process of refilling a mined-out pit with waste rock
BACT	Best Available Control Technology
bajadas	A type of plain found in arid or semi-arid regions, formed by deposition of debris in fan-shaped spreads, commonly as a result of sheet floods

barren solution	Non-precious metals-bearing dilute cyanide solution
bgs	below ground surface
BLM	Bureau of Land Management
BMSL	Below mean sea level
BP	Before Present
Bureau of Land Management	The agency of the United States Government, under the Department of the Interior, responsible for administering the public lands of the United States
CAA	Clean Air Act
CAAA	Clean Air Act Amendments
CAAQS	California Ambient Air Quality Standards
California Desert Conservation Area	Those public lands located in the California desert which have been identified by Congress in the Federal Land Policy and Management Act of 1976 as a unique area in need of special management by the Bureau of Land Management
California Desert Protection Act	A 1994 act which, among other things, gave wilderness designation to 69 individual areas of public land within the CDCA
California Environmental Quality Act	This act establishes the mechanisms by which government agencies in California document and consider the environmental implications of decisions made by the agency, and contains substantive provisions with which the government agencies must comply
California Regional Water Quality Control Board, Colorado River Basin Region (CRWQCB)	The California agency responsible for protection of the waters of the state in the Colorado River Basin Region, and for implementing California regulations, through the issuance of Waste Discharge Requirements, Waste Discharge Orders and National Pollution Discharge Elimination System permits

Cal-OSHA	California Occupational Safety and Health Act (or Administration)
Caltrans	California Department of Transportation
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CCR	California Code of Regulations
CDCA	California Desert Conservation Area
CDFG	California Department of Fish and Game
CDHS	California Department of Health Services
CEQA	California Environmental Quality Act
CESA	California ~~Environmental~~ Endangered Species Act
CFR	Code of Federal Regulations
Chemgold	Chemgold, Inc.
chipping station	An area which is comprised of a core and several flakes of the same worked material
CIP	Carbon-in-Pulp
cleared circle	Frequently interpreted as the archaeological remains of temporary shelters which were constructed or bent wooden poles and thatch
CMAGR	Chocolate Mountains Aerial Gunnery Range
CN^-	Free Cyanide
CNDDB	California Natural Diversity Data Base
CNPPA	California Native Plant Protection Act

CNPS	California Native Plant Society
CO	Carbon Monoxide
CO_2	Carbon Dioxide
Conditional Use Permit	The permit issued by Imperial County which authorizes certain activities in the county as a conditional use within certain zoned areas of the county
cone of depression	The depression in a watertable or piezometric surface produced by pumping
CRWQCB	California Regional Water Quality Control Board, Colorado River Basin Region
CSC	California Species of Concern
CUP	Conditional Use Permit
cyanide	A solid chemical compound (sodium or calcium cyanide) which is dissolved in water to form a solution suitable for the extraction of precious metals from ore by using a leaching process
desert pavement	An area consisting of stones that have been closely packed together to form a uniform, stony surface, generally without vegetation
DHS	California Department of Health Services
DWR	Department of Water Resources
EA	Environmental Assessment
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EMA	Environmental Management Associates, Inc,

endangered species	An animal or plant species which is in danger of extinction throughout all or a significant portion of its range
Environmental Assessment	An analytical document prepared under the National Environmental Policy Act that outlines the potential environmental effects of the Proposed Action and its possible alternatives and leads to a decision to prepare an Environmental Impact Statement or a Finding of No Significant Impact (FONSI)
Environmental Impact Report	A detailed statement prepared under the California Environmental Quality Act describing and analyzing the significant environmental effects of the proposed project and discussing ways to mitigate or avoid the effects
Environmental Impact Statement	An analytical document prepared under the National Environmental Policy Act that discusses the potential significant impacts to the human environment of a Proposed Action and its possible alternatives which is used by decision makers to weigh the environmental consequences of a potential decision
ephemeral	Temporary surface water flows occurring only after precipitation events
ESA	The federal Endangered Species Act of 1973
fanglomerates	A conglomerate formed by the lithifaction of an alluvial fan
FCR	field contact representative
fee land	Land in which the United States government has conveyed the fee simple interest in the surface, and possibly the minerals, into private ownership
FEMA	Federal Emergency Management Agency
FLPMA	Federal Land Policy and Management Act of 1976
GGX	Glamis Gold Exploration, Inc.
gpm	gallons-per-minute

HAP	hazardous air pollutant
H_2S	Hydrogen sulfide
HDPE	High Density Polyethylene
heap leach pad	A facility lined by impermeable material to collect the leach solutions which are slowly applied to a pile of ore placed in several layers, each approximately 25 feet in height, on top
Holocene	An Epoch of the Quaternary period, from the end of the Pleistocene (approximately 10,000 to 11,000 years ago) to the present
hydraulic conductivity	The quantity of water that will pass through a unit cross-sectional area of a porous material per unit of time under a hydraulic gradient of 1.00 at a specified temperature
hydraulic shovel	A hydraulically powered and operated device used to lift and load large quantities of material
ICAPCD	Imperial County Air Pollution Control District
ICDPW	Imperial County Department of Public Works
ICPBD	Imperial County Planning ~~and~~ /Building Department
IID	Imperial Irrigation District
ISDRA	Imperial Sand Dunes Recreational Area
Imperial County Planning and Building Department	Local Lead Agency responsible for implementing the California Surface Mining and Reclamation Act (SMARA) and the California Environmental Quality Act (CEQA), and for approving a Conditional Use Permit (CUP) with accompanying Reclamation Plan subject to conditions
isolates	Less than five (5) artifacts in a 2.5 square meter area
Jurassic	The period of time extending from 195 million years to 135 million years, having a duration of 60 million years

Key Observation Points	Points which were selected as representative of the possible views of a project area
KOPs	Key Observation Points
LCRS	Leachate Collection and Recovery System
leachate	Solution of soluble materials which is formed from percolation of water through strata
leached ore	The ore that has been leached of its precious metals by the leaching solution on the heap leach pad
lithic scatter	Surface scatters of flaked stone tools and manufacturing debris
lode	A mineral deposit that is contained within bedrock, as opposed to a placer deposit
MCL	Maximum Contaminant Level
Miocene	The epoch of the Tertiary period between the Oligocene and the Pliocene epochs
migratory bird	Any bird, whatever its origin and whether or not raised in captivity, which belongs to species listed in Section 10.13 of the Migratory Bird Treaty Act (16 USC 701-718h), or which is a mutation or a hybrid of any such species, including any part, nest, or egg of any such bird, or any product, whether or not manufactured, which consists, or is composed in whole or part, of such bird or part, nest, or egg thereof; all birds are considered migratory with the exception of: (a) the English sparrow; (b) starlings; and (c) barnyard pigeons.
mine and process area	See Project mine and process area
mineralized potential area	The area which co-joins the proposed ore pits and which delineates the outer boundary of potential mining activity
MSHA	Mining and Safety Health Administration
MWD	Metropolitan Water District

NAAQS	National Ambient Air Quality Standards
National Environmental Policy Act	The act that established the procedures by which the environmental consequences of a decision by agencies of the federal government are analyzed and documented prior to the decision being made
NECDEMP	Northern and Eastern Colorado Desert Coordinated Management Plan
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NOI	Notice of Intent
NO_x	Oxides of Nitrogen
NO_2	Nitrogen Dioxide
NORM	Naturally Occurring Radioactive Materials
NP	Neutralization Potential
NOP	Notice of Preparation
NPDES	National Pollutant Discharge Elimination System Permit
NRC	National Research Council
NRE	National Register Eligible
NRHP	National Register of Historic Places
NURE	national uranium resource evaluation
NVD	Night Vision Device
NVG	Night Vision Goggle
OHWM	ordinary high water mark

O_3	Ozone
OHV	Off-Highway Vehicle
open pit	The area from which ore and waste rock are removed
ORV	Off-Road Vehicle
OSHA	Occupational Safety and Health Administration
Overbuilding	Overbuilding consists of installing new, taller, wooden poles adjacent to existing wooden poles; installing higher voltage conductors near the top of new poles; moving the existing lower voltage conductors from existing poles to below the higher voltage conductors on new poles; then removing the existing poles
patented land	A mining claim for which the United States government has conveyed the fee simple interest in the surface and minerals into private ownership
Pb	Lead
petroglyph	A picture that has been etched onto a rock surface
placer	A deposit of mineral resources which is formed by an alluvial process and contained within alluvial material
Plan of Operation	A document prepared by the proponent of any mining development of locatable minerals and filed with the Bureau of Land Management, which presents a detailed discussion of the proposed project
Pleistocene	The first epoch of the Quaternary Period in the Cenozoic Era, characterized by the spreading and recession of continental ice sheets, and the appearance of modern man
Pliocene	The last epoch of the Tertiary Period in the Cenozoic Era, during which many modern plants and animals developed
PM_{10}	Particulate matter that is less than 10 microns in diameter

PMP	Probable Maximum Precipitation
POO	Plan of Operation
PPE	HDPE/polypropylene
PSD	Prevention of Significant Deterioration
porosity	The percentage of the bulk volume of rock, sediment, or soil that is occupied by interstitial spaces
pot drops	Pottery concentrations where individual pots were accidentally or intentionally broken and abandoned. Pot drops are often found along trails or near water sources
Precambrian	An era of geological time preceding the Paleozoic era, before 570 million years ago. Approximately 90 percent of all geological time occurred within this period
pregnant solution	A precious metals-bearing cyanide solution which contains sufficient quantities of gold and silver that can be sent to the precious metal recovery plant to remove the precious metals from the solution
Project area	Includes the Project mine and process area and the Project ancillary area
Project ancillary area	Used to describe the Project area excluding the mine and process area, which contains the ground water production wells and water pipeline, the electrical power metering station and new 92 kV transmission line, and the relocated portions of Indian Pass Road
Project mine and process area	Used to describe the Project area excluding the ancillary facilities area, which contains the open pits, waste rock stockpiles, soil stockpiles, administrative offices and maintenance facility area, heap leach facility, precious metals recovery plant and other facilities, internal roads, and the on-site diesel fuel generators if constructed

Proposed Action	A description of the project as proposed by the project proponent in the Plan of Operations and/or the Conditional Use Permit application
public land	Any land and interest in land owned by the United States within the states and administered by the Secretary of the Interior through the Bureau of Land Management, without regard to how the United States acquired ownership, except: (1) lands located on the Outer Continental Shelf; and (2) lands held for the benefit of Indians, Aleuts, and Eskimos
Quaternary	The second period of the Cenozoic era covering the past two (2) to three (3) million years
RACM	Reasonably Available Control Measures
Reclamation Plan	A document submitted to the Bureau of Land Management and Imperial County, the respective federal and local Lead Agencies, that details the specific measures to be taken by the project proponent to reclaim the project lands during mining operations and after mining and leaching have been completed
ROCs	Reactive organic chemicals
ROGs	Reactive organic gases
ROM	Run-of-Mine
ROW	Right-of-Way
Run-of-Mine	Describes ore which is not crushed prior to processing
Salton Trough	A landward extension of the East Pacific Rise, a zone of rifting and crustal spreading which created the Gulf of California
SBB&M	San Bernardino Baseline & Meridian
SCAQMD	South Coast Air Quality Management District

SEDAB	Southeast Desert Air Basin
sensitive receptor	In general, areas of habitation where the intrusion of noise has the potential to adversely impact the occupancy, use or enjoyment of the environment; sensitive receptors include, but are not limited to, residences, schools, hospitals, parks and office buildings
sensitive species	Plant or animal species which are susceptible or vulnerable to activity impacts or habitat alterations; a plant or animal species recognized as being depleted, rare, threatened, or endangered and recognized as requiring special management to prevent placement on federal or state lists
SHPO	State Historic Preservation Officer
significant environmental impact	A substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance
SMARA	Surface Mining and Reclamation Act
SOCAB	South Coast Air Basin
soil stockpile	Locations within the mine and process area where excavated soils are stockpiled for future revegetation purposes
SO_2	Sulfur dioxide
SO_4	Sulfur
SO_x	Sulfur oxides
SPLP	Synthetic Precipitation Leaching Procedure
solution ditch	An above-ground, trough-shaped structure that is lined with an impermeable material and engineered to convey cyanide solution from the heap leach pad to the solution pond; none will be used for the Imperial Project

solution pond	A bowl-shaped structure that is lined with an impermeable material and engineered to contain cyanide solution from the heap leach pad for processing in the precious metals recovery plant and subsequent recirculation to the heap leach pad
Surface Mining and Reclamation Act	An act passed by the California legislature which prescribes the reclamation of mined lands within the state of California and directs the Counties within the state to review and approve a Reclamation Plan of each mining operation as part of the County's Conditional Use Permit process
swell factor	Term used to describe condition whereby broken rock occupies a greater volume than the same weight of solid rock
TDS	Total Dissolved Solids
T/E	Threatened and Endangered
transmissivity	The rate at which water is transmitted through a unit width of an aquifer under a unit hydraulic gradient which is typically expressed in units of gallons per day per foot
TPY	tons per year
TSP	Total Suspended Particulates
TTLC	Total Threshold Concentration Limit
UBC	Uniform Building Code
unnecessary or undue	In conjunction with the degradation of lands, describes activities which would cause environmental impacts greater than what would normally occur for specific activities, or would be necessary to conduct specific activities
Unpatented	A mining claim for which the United States government has not conveyed the fee simple interest in the surface and minerals into private ownership
USBR	United States Bureau of Reclamation

USDI	United States Department of Interior
USDOE	United States Department of Energy
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
USMC	United States Marine Corps
vadose zone	The unsaturated zone above the water table
Visual Resource Management System	The Bureau of Land Management system used to identify visual values; establish objectives for managing these values; and provide information to evaluate the visual effects of proposed projects
VFR	Visual Flight Rule
VRM	Visual Resource Management
WAPA	Western Area Power Authority
Waste Discharge Requirements	A permit issued by the California Regional Water Quality Control Board which governs the construction, operation and closure of the heap leach pad, process ponds and the precious metals recovery plant
waste rock stockpile	Location within the mine and process area where excavated waste rock from the pits is stockpiled
WSA	Wilderness study area

11. INDEX

~~[NOTE TO THE READER OF THE PROOF DRAFT EIS/EIR: The Index will be completed once the text of the Draft EIS/EIR has been accepted by the BLM and ICPBD]~~

APPENDIX A

CHEMGOLD, INC. IMPERIAL PROJECT
RECLAMATION PLAN

Revised Copy of October 1, 1996

APPENDIX ~~A~~ B

SCOPING DOCUMENTS

Revised Copy of October 1, 1996

APPENDIX ~~B~~ C-1

CHEMGOLD, INC. IMPERIAL PROJECT
WASTE CHARACTERIZATION STUDY

Revised Copy of October 1, 1996

APPENDIX C-2

SUPPLEMENT TO CHEMGOLD, INC. IMPERIAL PROJECT WASTE CHARACTERIZATION STUDY

Revised Copy of October 1, 1996

~~APPENDIX C~~

~~CHEMGOLD, INC. IMPERIAL PROJECT~~
~~RECLAMATION PLAN~~

Revised Copy of October 1, 1996

APPENDIX D

WATERS STUDY, CHEMGOLD INC., IMPERIAL PROJECT, IMPERIAL COUNTY, CALIFORNIA

Revised Copy of October 1, 1996

APPENDIX E-1

HYDROLOGY BASELINE REPORT FOR THE IMPERIAL PROJECT
IMPERIAL COUNTY, CALIFORNIA

Revised Copy of October 1, 1996

APPENDIX E-2

SUPPLEMENT TO HYDROLOGY BASELINE REPORT FOR THE IMPERIAL PROJECT IMPERIAL COUNTY, CALIFORNIA

Revised Copy of October 1, 1996

APPENDIX F

VEGETATION BASELINE SURVEY, IMPERIAL PROJECT, IMPERIAL COUNTY, CALIFORNIA

Revised Copy of October 1, 1996

APPENDIX G

BIOLOGICAL SURVEY REPORT, CHEMGOLD IMPERIAL PROJECT, CALIFORNIA

Revised Copy of October 1, 1996

APPENDIX H

POSSIBLE BAT OCCURRENCES ON THE CHEMGOLD IMPERIAL PROJECT SITE

Revised Copy of October 1, 1996

APPENDIX I

DESERT DEER AND THE CHEMGOLD IMPERIAL PROJECT

Revised Copy of October 1, 1996

APPENDIX J-1

CULTURAL RESOURCES INVENTORY OF INDIAN PASS: AN INVENTORY AND EVALUATION FOR THE IMPERIAL MINE PROJECT, IMPERIAL COUNTY, CALIFORNIA

Revised Copy of October 1, 1996

APPENDIX J-2

A SUPPLEMENTAL CULTURAL RESOURCES INVENTORY AND EVALUATION OF THE POWER SUPPLY ROUTE FOR THE IMPERIAL PROJECT, IMPERIAL COUNTY, CALIFORNIA

Revised Copy of October 1, 1996

APPENDIX K

VISUAL CONTRAST RATING SHEETS

APPENDIX L

CHEMGOLD IMPERIAL PROJECT
AIR QUALITY ANALYSIS

Revised Copy of October 1, 1996